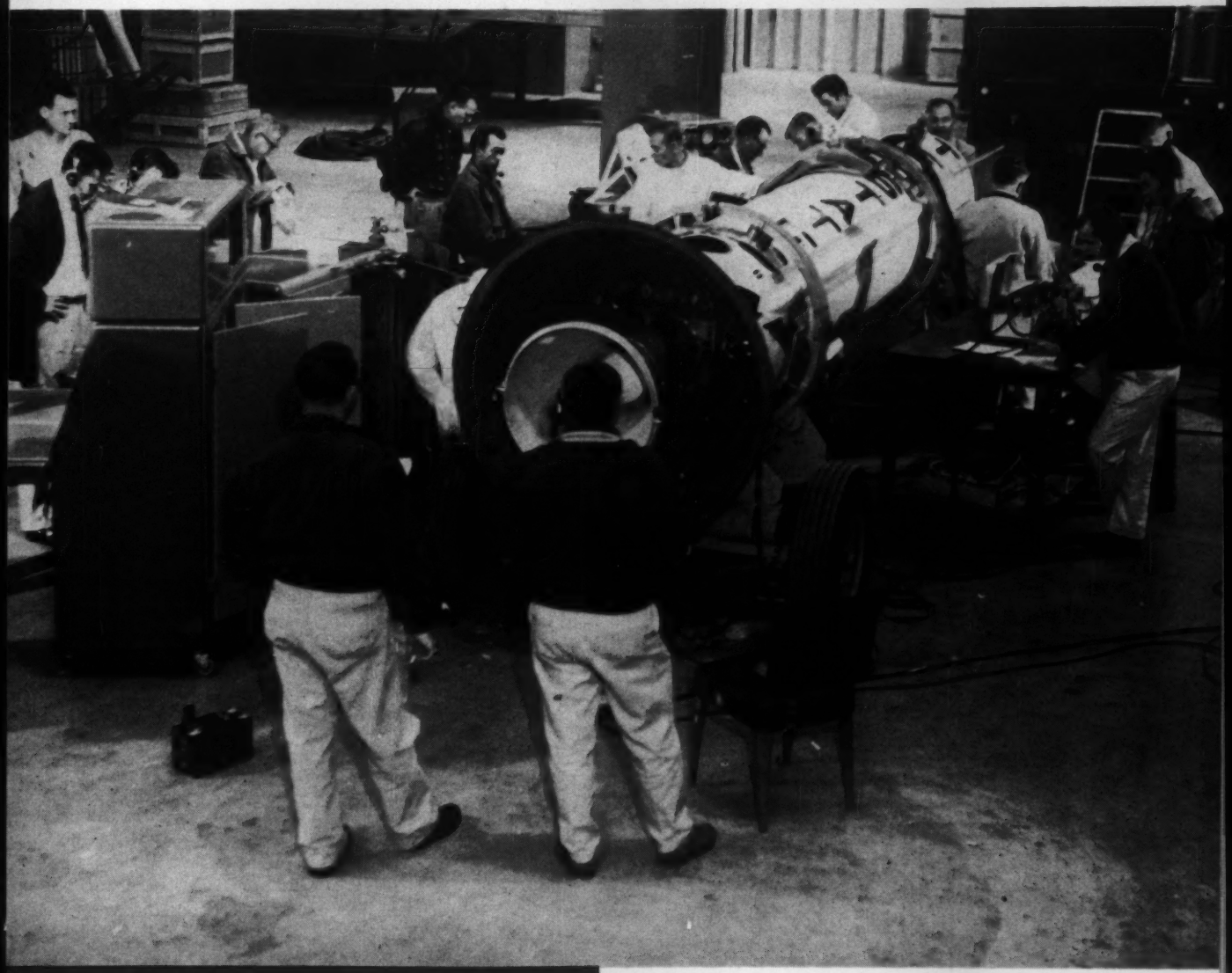
The IRON AGE

April 7, 1960 A Chilton Publication The National Metalworking Weekly



Is Aerospace Headed for Top Spot In Industry? P. 47

How 116-Day Strike Hit Steel Earnings – P. 56

New Nickel Process Forms Intricate Dies – P. 89

Digest of the Week – P. 2-3

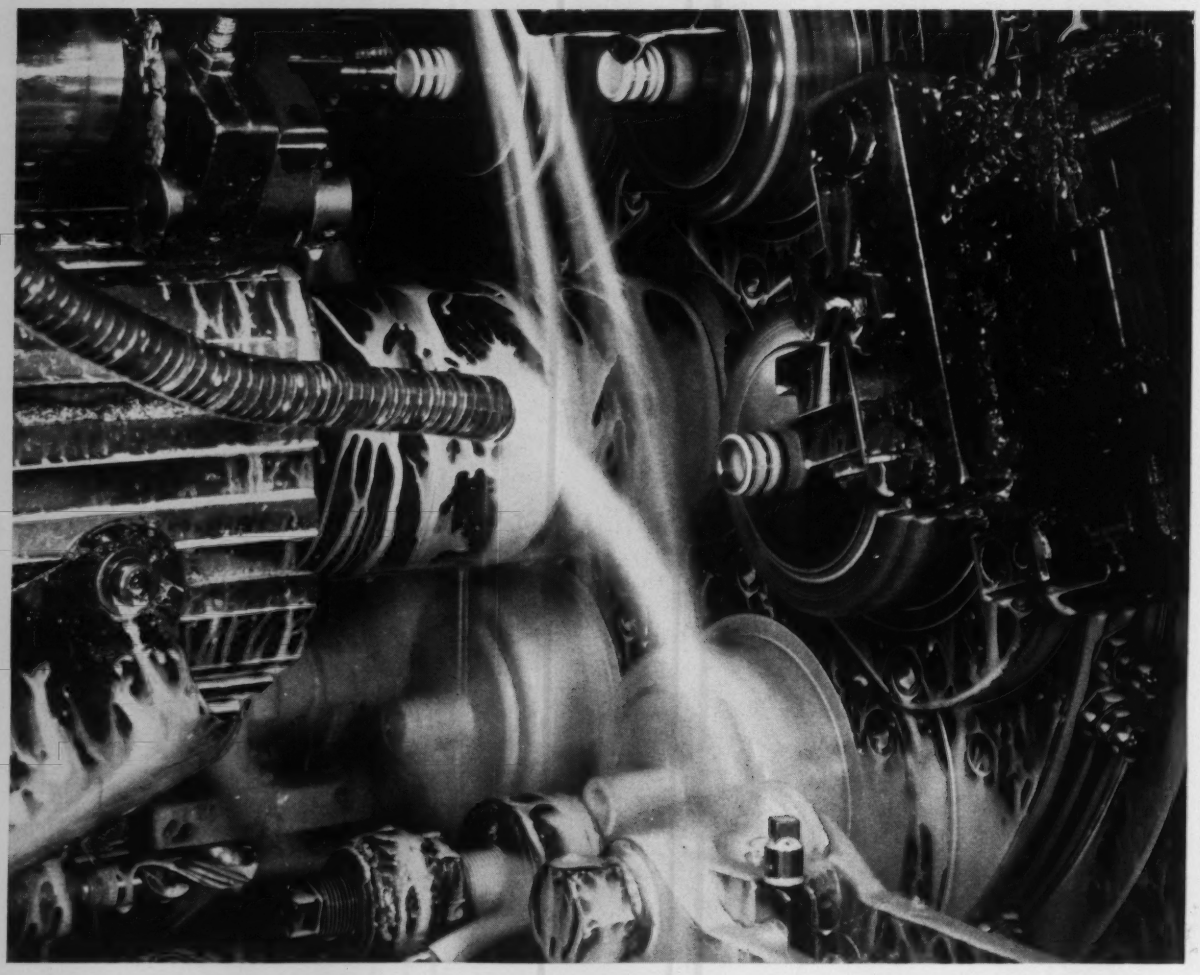
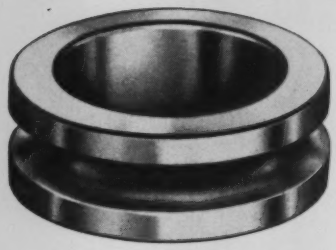


Photo courtesy SKF Industries, Inc.



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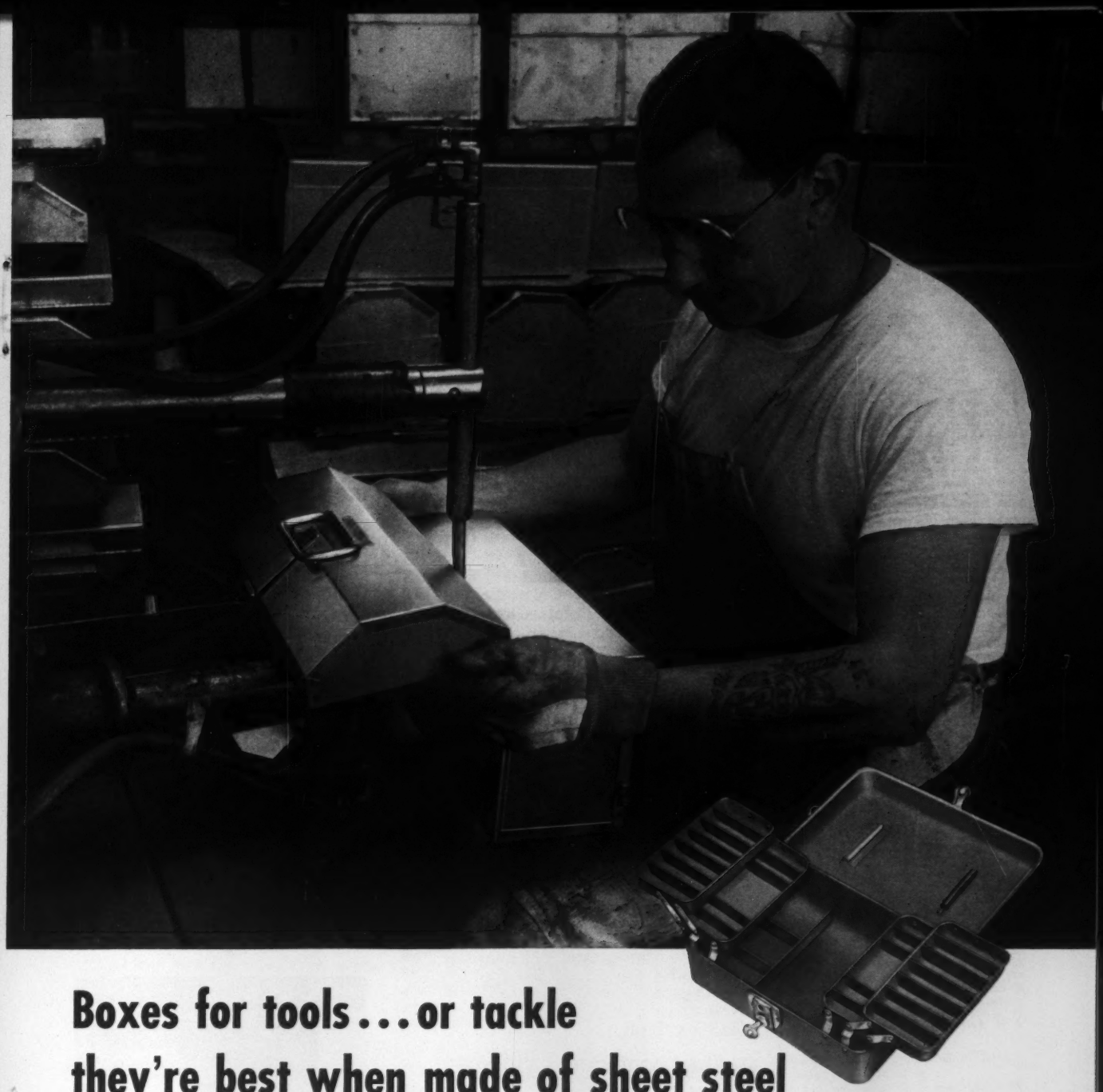

Boxes for tools . . . or tackle they're best when made of sheet steel

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The IRON AGE

April 7, 1960—Vol. 185, No. 14

Digest of the Week in

★Starred items are digested at right.

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News of the Industry

IRON AGE INTERVIEWS

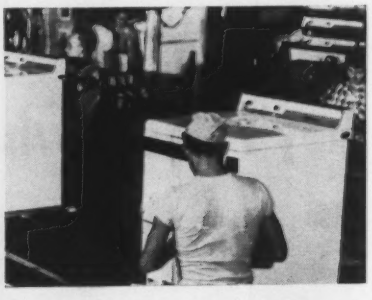
Market Outlook—In an exclusive interview, Republic Steel's L. S. Hamaker gives his opinions in the vital issues that affect the steel market. P. 50

PREFAB NUCLEAR PLANT

Eases Fueling Problems—A skid-mounted nuclear power reactor, for use at remote Army base in Arctic, simplifies the problem of bringing in fuel. It operates for 12 months on single loading of fuel. P. 51

APPLIANCE SALES

Gloom Unfounded—Despite pessimistic earlier reports, appliance makers say sales generally equal or



up over last year. Factory orders expected as dealer-distributor stocks diminish. Few soft spots felt. P. 52

STEEL EARNINGS IN '59

Profit Margins Declined — Steel producers had an amazing and con-

Metalworking

Cover Feature

SPACE SPENDING: Future missile and space programs will be even more costly than at present. They could boost aerospace to the top position in industry. Defense and civilian space programs will cost $8 billion next year alone. P. 47

fusing year in '59. Shipments and earnings topped 1958. But earnings didn't gain as much as sales and profit margins fell. P. 56

AUTOMOTIVE

Cold Story—Ford researchers say cryogenics will play an important part in automaking in the future. New developments will mean better cars, they say. P. 67

Engineering-Production Developments

PURE NICKEL DIES

Without Machining — A new nickel carbonyl process produces pure nickel duplicates from original masters in a deposition chamber. This method not only bypasses costly machining, but gives longer life to the dies and molds produced. And the process handles intricate molds in stride. P. 89

SHEET METAL PARTS

Punching Them Out—Using a copying stylus, an operator follows a color-coded template pattern. By remote control, a punching device reproduces the pattern in a sheet metal blank. The fabricator-duplicator machine punches, notches and nibbles sheet metal—up to ¼-in. thick mild steel. P. 94

REPAIR CASTING FLAWS

With Weld-Quench Method—A three-step welding procedure cuts 90 pct from conventional welding time in the repair welding of cast iron. After each welding pass is deposited, it's immediately water quenched. This eliminates the usual slow cool between passes. P. 96

ELECTRON BEAM MELTING

Used on New Alloy—Electron beam melting plays a vital role in the development of a new tantalum-tungsten alloy. Properties include a tensile strength of 45,000 psi at 2200°F. The metal meets the demands for rocket engine parts. P. 98

FAST HANDLING SYSTEM

Aids Foundry Operations — A new system for handling molds is said to provide foundry management—particularly owners of jobbing foundries—with greater flexibility of operations. Roller-top pallets make up the system. P. 100

Market and Price Trends

WASHINGTON

Export Aid—Industrial heating equipment men, in face of declining exports, ask Washington for aid through lower foreign tariffs and for broader commercial risk guarantees. P. 71

WEST COAST

Natural Gas Demand Grows—Spending by natural gas companies in the Farwest will amount to $40 million this year. Increasing demands for the fuel assure a good market for metalworking suppliers. P. 73

STEEL SUMMARY

Critical Period—April will be a time of decision for steel users. Unless steel consumption reaches a higher level than now appears to be the case, steel operations are in for a big drop. There are some plus factors in the picture, however. P. 139

PURCHASING

Lease Deal Signed—Press maker joins forces with leasing company. Leasing to be big sales gun for Verson Allsteel. P. 140

NEXT WEEK

NUMERICAL CONTROLS

Get the Facts—Numerical controls, the subject of next week's award-winning series, "How to Get More for Your Metalworking Dollar," describes the controls now on the market and the ones that will help increase your production rates.

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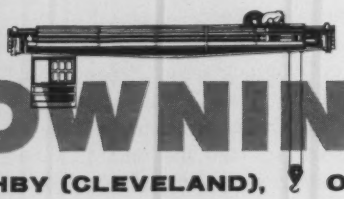

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4. The High Strength Bearing Bolt assembly (bolt, nut, one washer) costs no more, grip for grip, than a High Strength Bolt assembly (bolt, nut, two washers).
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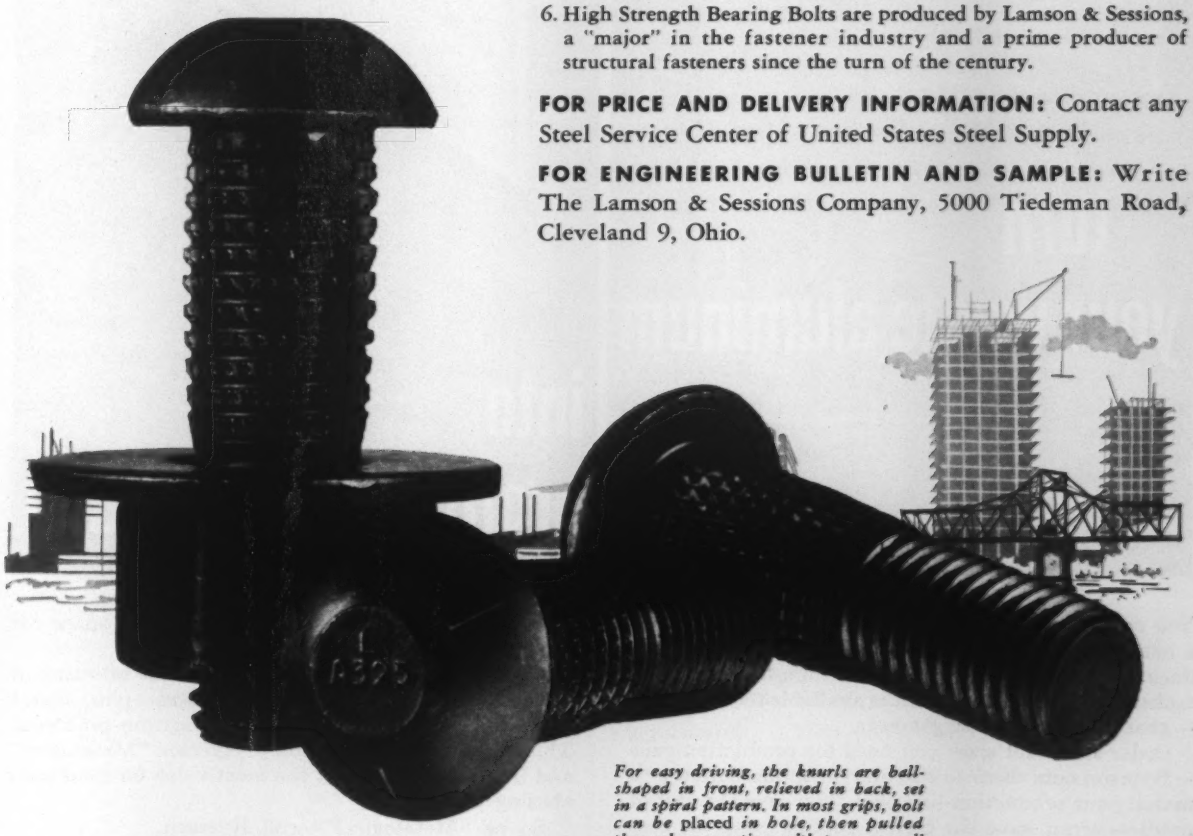

For easy driving, the knurls are ball-shaped in front, relieved in back, set in a spiral pattern. In most grips, bolt can be placed in hole, then pulled through connection with torques well below final assembly torque. One man can install—no need to hold the head.

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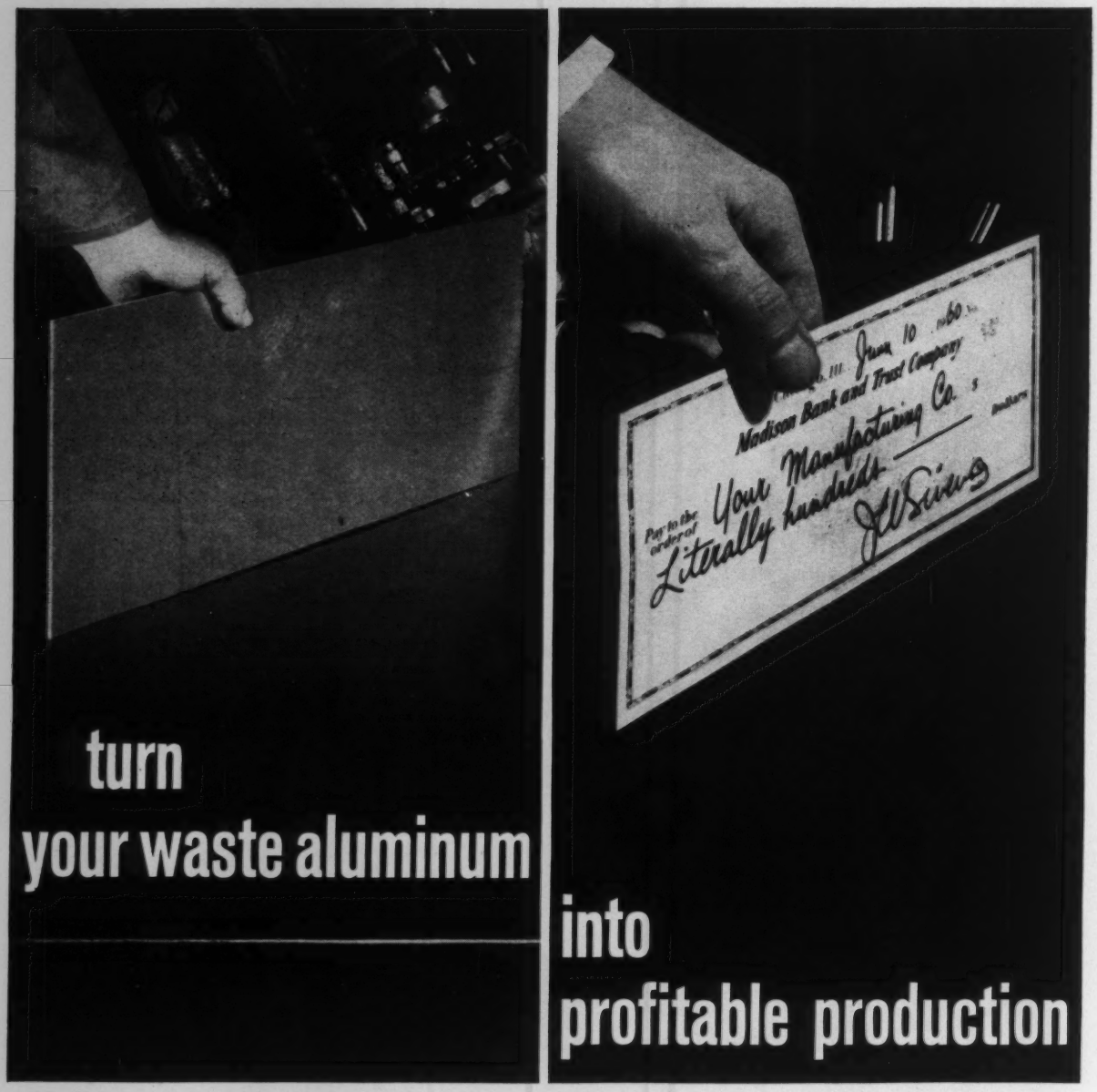

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Optimism Unlimited: It Pays Off In The End!

A few flashing red signs in the economy don't add up to a recession. True, some earlier forecasts have fallen on their faces. True also, changes in a few industries have caught some by surprise.

Yet, already we hear, "We can talk ourselves into a recession." A few want all questionable—to them—business news censored. Others want to eliminate these words: Recession, bad news, downturn, and depression.

A few lusty souls would like to do something —short of murder—to the headline writer. They wish he would write more sedate titles on his heads.

But like spring fever, all this is familiar. It means the business indexes have failed to go through the roof. They are not going to uptrend indefinitely as we dreamed they would. In fact, they might drop some as past excesses are corrected.

Chances are that when corrections come they won't be drastic, since the excesses were not so great. No matter what happens, though, the cynics and the pessimists will soon be looking down their noses at the optimists. This usually happens when things stop going up and when sober thoughts take over.

In times like these all people—except optimists —begin to have doubts about optimism. Arguments flair up over whether whistling in the dark pays off. This is a good time to see if it does pay to be an optimist.

Maybe we should excuse comptrollers, treasurers, purchasing agents, chairmen of the board, and those with their bets already placed. Under some conditions they must—or think they must —be pessimistic. In a way, it is an occupational hazard.

But when it comes to company presidents, sales managers, salesmen, and promotion people, it is suicide to be a pessimist. And it won't do at all to be one, no matter what the index is now, what it will be next week, and what it may be next year.

Optimism failure among sales-minded people could mean the others might not have a job. Too much discounting and not enough refusal to give up can cost a lot.

This is the time when the optimists have to stand up and be counted. They must put to work what they have said at banquets, meetings, and sales courses. If they don't, they are lost.

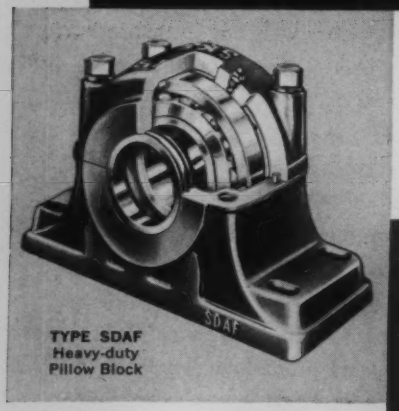
It always pays off to be an optimist!

Tom Campbell

Editor-in-Chief

TYPE SAF
Ball or Spherical Roller
Bearing Pillow Block

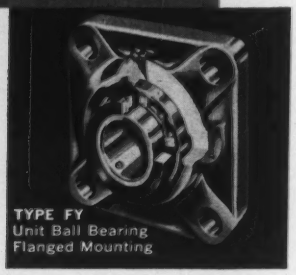
Can you get these "special" qualities in "standard" pillow blocks?



TYPE SDAF
Heavy-duty
Pillow Block

TYPE SY
Unit Ball Bearing
Pillow Block

TYPE SES
Unit Rubber-flex Ball
Bearing Pillow Block



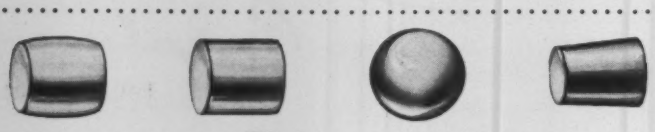
TYPE FY
Unit Ball Bearing
Flanged Mounting

Most pillow blocks offer easy assembly and rugged housings. But can they offer you low friction, self-aligning bearing operation and efficient sealing as well?

They can—if they're the SKF pillow blocks, and flanged mounting, shown here. Type SAF, for example, comes equipped with low-friction ball or spherical roller bearings that are *inherently* self aligning. And these bearings are effectively protected by Triple-Seal rotating rings. Abrasives and corrosives can't get to them—oil or grease can't drip out.

Yet this is a standard SKF pillow block, that is competitively priced in spite of its combination of extra features. We make it for shaft sizes from ¾" to 10½", for mounting directly or with an adapter. A cast steel housing (SAFS) is available for heavy duty applications.

For details, call one of our twenty-four offices. 5938



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Tool and Die Making Trend

Look for a major breakthrough in numerical techniques to bring about radical revision of tool and die making. Observers at a recent production forum of the National Engineering Society report that such developments are at the threshold of practicality. Some forging dies for the aerospace field are already being made by these advanced methods.

Hand Forging Provides Key

Fantastic speeds will soon be generated in industry's first major hypersonic wind tunnel. A massive aluminum hand forging—believed to be the world's largest—is the heart of the tunnel. The giant 8230-lb forging serves as a core for a coating of nickel. It forms the largest nickel liner ever made.

Mills Expand Facilities

Steel mills are pushing ahead with major development and expansion projects. Programs now underway include: building of a pilot plant for pressure casting; engineering of two more basic oxygen installations; engineering of electric furnaces and pressure casting for a specialitv mill.

Prevent Hot Cracking

Sulfur and phosphorus in alloy steels cause appreciable hot cracking if either exceeds about 0.017-pct weight. This holds true even when one of these elements is present below 0.010 pct. A combined total of the two elements exceeding 0.020 to 0.025 pct creates serious difficulties. Thus, a limit of 0.010 pct of each element is most desirable.

More Trade With the Reds?

Trends to watch in the export market: U. S. exporters report that Red China continues to produce exact imitations of U. S. equipment—but without reaching quality levels. At the same time, a handful of American capital-goods manufacturers are adding Russia to countries visited on their European selling tours. These visits are in response to a growing number of Russian inquiries for U. S. goods.

Improves Chip Breaking

High-speed machining with an oscillating cutter—to improve chip breaking—has been thoroughly investigated in the Soviet Union. Frequency of oscillations should differ from the revolutions of the workpiece by at least 10 pct, otherwise the chip remains unbroken. Oscillation of the tool has no significant effect on accuracy, surface finish and tool life.

Join Honeycombs Faster

A new welding unit handles high-speed precision splicing of structurally-critical, honeycomb-core materials. It averages twelve to fifteen welds per second—compared to one weld per second for comparable hand welders. Each weld is a separate operation, automatically triggered as the operator exerts pressure on tweezer points.

Compound Resists Oil

With a dense, uniform, non-absorbing, closed-cell structure, a new fluorosilicone sponge-rubber compound resists fuels and lubricants at high temperatures. It also possesses immunity to aging, ozone and weather hardening. In addition, it has excellent dielectric properties and exhibits good compression-set resistance. This material is recommended for vibration dampening, fairing strips and soft gasketing.

European Steel Outlook

Although the European community's steel productivity is below that of the U. S., Europe may someday catch up. Louis Lister, noted economist, who has often represented the U. S. in Europe, reports that catching up would take them a long time—20 years at best. Lister says that present U. S. steel productivity is up to 2½ times that of the European nations.

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FATIGUE CRACKS

Numerical Controls

There's hardly a development that has caught the fancy and imagination of metalworking people to the same degree as numerical controls.

To some, it's an answer to complex machining and fabricating jobs. To others, it means savings that can't be achieved by other methods. Many on the management level still haven't reached a decision on the "instrument vs. return" problems that the subject poses. Still others are taking a "wait and see" attitude until the benefits and the trends become more clear.

Numerical Control "Dollar"—Because of timeliness and importance, The IRON AGE editors have chosen numerical controls for the special feature series "How to Get More for Your Metalworking Dollar." It will appear in next week's issue.

What are the cost factors? How much must you invest? What are the areas and extent of the equipment's usefulness? What's a good rate of return? What are your actual savings? Are numerical controls a good buy for the jobs on hand?

Or take the matter of selection. Here are some points to be considered: Type of equipment best suited to specific jobs; programming of input by cards or tape; sequence of operations, fixtures, tools speeds and feeds.

Other Areas — In addition the article will delve into scheduled maintenance, reliability, training of personnel and many other aspects, all of which can tell how numerical controls can increase productivity, improve quality and stretch your metalworking dollar.

This special issue will also include a preview of materials and tooling to be displayed at the Tool Engineer's Show, as well as the program of technical sessions and a list of exhibitors.

Do Not Freeze

Making a movie in a steel mill this summer? If so, you might take a tip from Mike Stumm, who recently had a 45-minute color film shot for Crucible Steel Co. of America. (See "New Films", P. 131)

Said Mr. Stumm, "We kept the film—exposed and unexposed—in a portable Coca-Cola refrigerator while shooting in the electric furnace shop." (Pepsi is OK, too—Ed.)

Up and Up

What a difference a day makes —or in this case, 60 days.

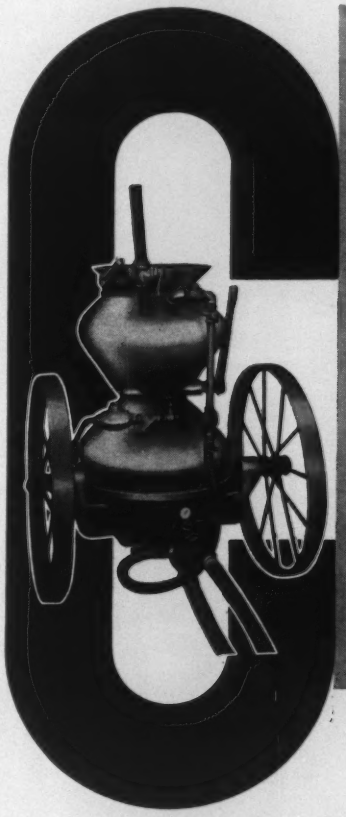
Our assistant news editor, Hilary R. Neal, was poring over the huge pile of interview notes and background information he had gathered for this week's cover story when he appeared to choke.

Cause of the disruptive outburst: On Jan. 27, 1960, Dr. T. Keith Glennan, administrator of the National Aeronautics and Space Administration, appeared before the House Committee on Science and Astronautics.

The Spoken Word—His opening statement: "I appreciate this opportunity to discuss NASA's program and its $802 million budget appropriations request for fiscal year 1961."

Sixty days later, on March 28, he appeared before the Senate Committee on Aeronautical and Space Sciences. His opening statement: "I want to thank you for this opportunity to present NASA's $915 million budget appropriations request. . . ."

There is little doubt that space spending is growing fast. For an idea of where it's going and what the future holds for the aerospace industry, be sure to read this week's cover story starting on P. 47.



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Automatic Bull Block

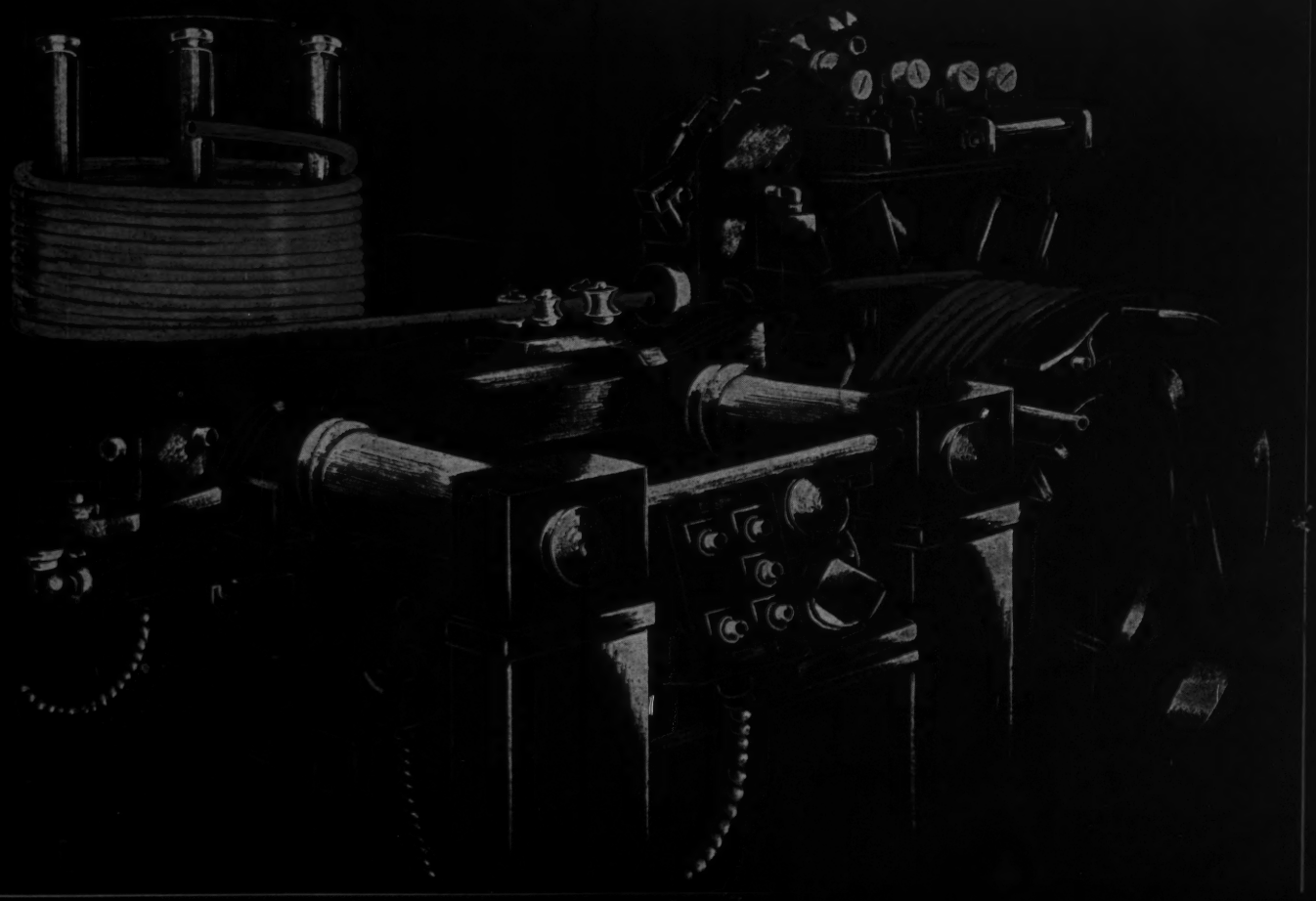
for copper

Place coil in tray and feed point into die. Press the button, that's all. This Automatic Bull Block does the rest. Finished tubing emerges. Features include Automatic Gripping, Automatic Grip Release, Heavy Traverse Feed.

This is a 36" Bull Block drawing down copper from 5/8" to 1/8" at high speeds.

The Automatic Bull Block can be furnished in all sizes up to 84" diameter. Producing long lengths at high speeds automatically really brings down those costs. For complete information on the Block or any other Cold Draw equipment for tubes, bars, or shapes, write to: Cold Draw, Aetna-Standard Division, Blaw-Knox Company, Pittsburgh 30, Pennsylvania.

Aetna-Standard Division
BLAW-KNOX



The "Five Percenters"

Sir—I have read The IRON AGE for several years and always make it a point to at least read your editorial in each issue. I think they are good, and generally I agree with what you say. In fact they are so "down to earth" that only a person out of his mind would disagree with you. It is this fact which prompts this letter.

For instance, refer to your recent editorial in the March 17 issue. "The Five Percenters: How Do They Get That Way?" The facts you state are familiar to all of us, I am sure. The proper answers to the questions you ask are likewise apparent to all of us. And so it goes with practically all of your editorials.

Political View — We average Americans are "fed up" with oppressive taxation by and extravagance in our Government. Our politicians, and they are all the same, seem to think there is an inexhaustable supply of funds easily available by simply taxing the middle or working class, which is also the majority class. Sooner or later, I predict the American citizen will rise in rebellion against this philosophy.

However, we "small potatoes" are naturally slow to anger and are ignorant, more or less, of the proper steps to take to correct this deplorable situation. So—instead of you continually pointing out what is wrong and asking the reader questions, the answers to which are apparent, why don't you take a more constructive attitude and devise ways and means of overcoming our present bad situation.—Richard R. Thomas, Pittsburgh, Pa.

Time to Think

Sir—Liked your editorial in the March 24 issue titled "Are You Lost for Time—To Better Think It Through?" Could we have 30 copies for our salesmen?—George C. Kastnet, chief engineer, MacDermid, Inc., Waterbury, Conn.

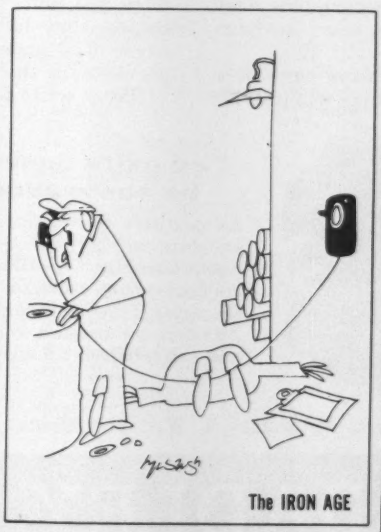
Copies are on the way.—Ed.

Newsfront

Sir—In the Feb. 25 issue of The IRON AGE, a caption describes "good strength at 2200°F" for a Columbium base alloy developed by Union Carbide Metals Co., designated CB-7. I would appreciate having full particulars on mechanical and physical properties both at room and elevated temperatures, as well as data on fabricability and especially welding techniques.

Comments would also be appreciated on oxidation characteristics and how the oxidation product performs at elevated temperature in terms of coating integrity and self healing characteristics. — W. H. Brokenshire, Canadian Development and Research, International Nickel Co. of Canada.

For full information, contact A. A. Layne, Union Carbide Metals Co., Div. of Union Carbide Corp., 30 E. 42d St., New York 17, N. Y. —Ed.



"I'd better run, that was the boss."

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the sling chain with everything

- high resistance to impact loading
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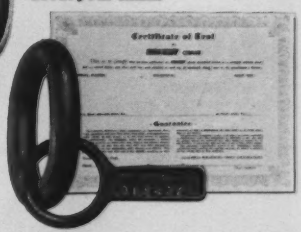
FIRST TO BE TESTED, REGISTERED AND GUARANTEED. A Certificate of test including guarantee is issued for each new Herc-Alloy Sling Chain shipped from our factory. A metal registration tag is permanently attached bearing the serial number which is recorded in our engineering files with full details about your chain.



FIRST CHOICE WITH EXPERIENCED CHAIN BUYERS SINCE 1933

Herc-Alloy is the original alloy steel chain...is heat treated by a special process... is electrically welded by exclusive Inswell time-tested method. All attachments are alloy steel including those to your specifications which are forged in our own shop. Specify Herc-Alloy for the best of everything in sling chains.

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CM CHAIN

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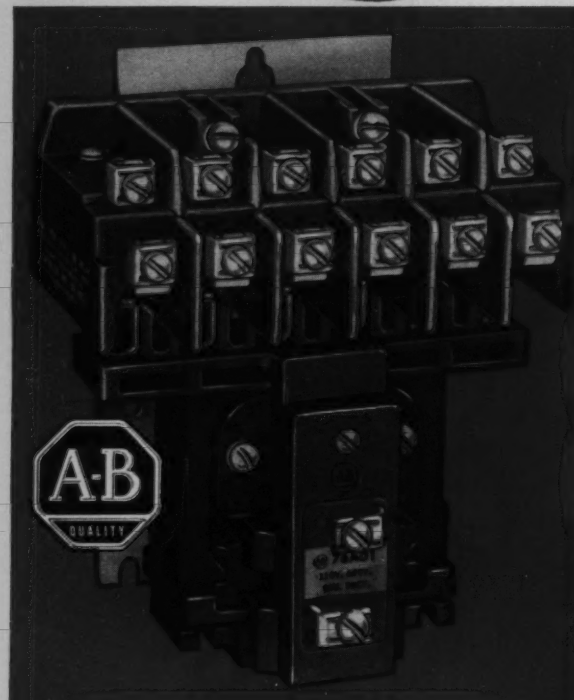


Bulletin 700 Type BR Relay with all six of the convertible poles arranged for normally open contact operation.

Allen-Bradley Convertible Contact CONTROL RELAY

BULLETIN 700
TYPE BR

Changeover made in seconds!

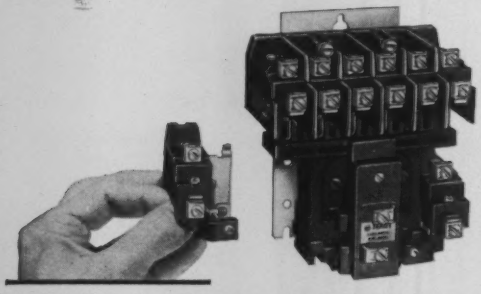
The contacts of the new Type BR relay can be arranged for either normally open or normally closed operation—and any changeover in the field can be made in seconds. A screwdriver is all that's needed.

This new A-B Bulletin 700 Type BR relay is ideal for use on automatic machines where control functions are frequently altered to meet production changes.

Quick convertibility of the contacts enables easy "on-the-spot" changes—from "normally open" to "normally closed"—or vice versa.

These new Bulletin 700 Type BR relays have been exhaustively tested to make sure that they will provide the many millions of trouble free operations for which all A-B controls are famous. In fact, the Bulletin 700 Type BR relays will establish new standards for long relay life and "reliability" of contact operation. Of course, they have double break, silver contacts that never need attention; also, the cast-plastic coil is impervious to the most severe atmospheric conditions.

Please write for full details, today!



Two extra convertible poles can be easily added—in the field

An auxiliary convertible contact pole—having full switching capacity—can be easily added to the left and right sides of the Type BR relays. These auxiliary poles are front-mounted and can be added without disturbing the wiring of the relay—and without removing the relay. All relays are designed to also accept stab connectors, and—all terminals are accessible from the front.

Allen-Bradley Co., 1341 S. First Street, Milwaukee 4, Wis. In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

ALLEN-BRADLEY QUALITY MOTOR CONTROL

COMING EXHIBITS

Tool Show—April 21-28, Detroit Artillery Armory, Detroit, (American Society of Tool Engineers, 10700 Puritan, Detroit 38.)

Powder Metallurgy Show — April 25-27, Drake Hotel, Chicago. (Metal Powder Industries Federation, 60 E. 42nd St., New York.)

Welding Show—April 25-29, Great Western Exhibit Center, Los Angeles. (American Welding Society, Inc., 33 West 39th St., New York 18.)

1960 Castings Congress & Exposition—May 9-13, Convention Hall, Philadelphia. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

Southwestern Metal Show — May 9-13, State Fair Park, Automobile Bldg., Dallas, Texas. (American Society for Metals, Metals Park, Novelty, O.)

Design Engineering Show — May 23-26, Coliseum, New York. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Production Engineering Show — Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago. (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Iron & Steel Show—Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

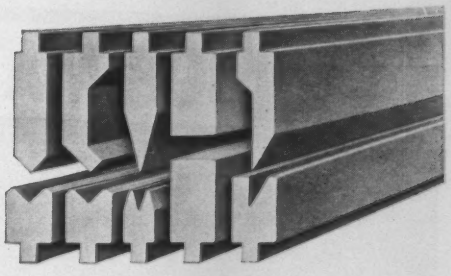
MEETINGS

APRIL

Steel Shipping Containers Institute, Inc.—Annual meeting, Apr. 12-14, The Breakers, Palm Beach, Fla. In-

(Continued on P. 16)

press brake tooling



Standard Type PRESS BRAKE DIES

62 different sizes and styles • Most in stock for off-the-shelf delivery

CHICAGO standard type press brake dies are used for a large variety of bending operations in any make or size of standard press brake. They are economical, and the quick delivery saves time in tooling up. Available in any length from 4 to 12 feet in increments of 2 feet; *induction hardened* or Diekrome steel.

The local distributors listed below offer immediate delivery on many sizes and styles of standard type CHICAGO press brake dies. If you have Bulletin STD-959 you can order any standard type die by number. Why not ask your nearest distributor for a copy? Also, if your requirements call for special multibend and forming dies, he can tell you about Dreis & Krump complete tooling service for any make of press brake.

Call your nearest distributor

ALABAMA
Birmingham
Hinkle Supply Co., Inc.
FAirfax 2-4541

CALIFORNIA
Los Angeles
Meyer Sheet Metal Mchry. Co.
MAdison 2-1477
San Francisco
Harron, Rickard & McCone Co.
ATwater 2-2202

GEORGIA
Atlanta
Allison Mchry. Co.
JAckson 4-1741

INDIANA
Indianapolis
E. L. Humston Co., Inc.
WAlnut 5-9691

IOWA
Bonaparte
Corry's Machine & Tool—Phone: 112

KANSAS
Wichita
Ellfeldt Mchry. & Supply Co.
AMherst 7-9773

MASSACHUSETTS
Cambridge
Austin-Hastings Co., Inc.
KIrkland 7-4480

MICHIGAN
Detroit
J. Lee Hackett Co.—TRinity 2-6442

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Girard Steel Supply Co.
MArket 8-1001
Minneapolis
Minnesota Steel & Mchry. Co.
FEderal 3-6273
St. Paul
Girard Steel Supply Co.
MIdway 6-8635

MISSOURI
Kansas City
Ellfeldt Mchry. & Supply. Co.
VIctor 2-5494

NEW YORK
New York
Federal Machinery Corp.
CAnal 6-3022
H. Weiss & Co.
CAnal 6-4256

NORTH CAROLINA
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Wm. K. Stamets Co.
MAin 1-5124
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AXminster 4-4701

OKLAHOMA
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Hart Industrial Supply Co.
REgent 9-2541
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LUther 3-2175

OREGON
Portland
Pacific Metal Co.
CApitol 7-0693

PENNSYLVANIA
Philadelphia
Delaware Valley Mchry., Inc.
OLdfield 9-4600
Milton Equipment Co.
WAlnut 2-1734
Pittsburgh
Wm. K. Stamets Co.
ATlantic 1-8091

TEXAS
Dallas
Briggs-Weaver Mchry. Co.
LAkeside 8-0311
Fort Worth
Briggs-Weaver Mchry. Co.
EDison 6-5621
Houston
Mehl Machinery, Inc.
FAirfax 3-1313

WASHINGTON
Seattle
Pacific Metal Co.—MAin 6925

WISCONSIN
Milwaukee
Production Equipment, Inc.
GReenfield 6-6075

CANADA
A. R. Williams Mchry. Co., Ltd.

ALBERTA
Calgary—Phone: 5-4425
Edmonton—Phone: 24341

BRITISH COLUMBIA
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"Job-Mated" cranes by Shepard Niles fit the job picture perfectly because each one is built to meet exact on-the-job conditions. The ideal combination of capacity, clearance, speed and controls is specified to assure years of highly efficient, economical service, and to keep wear and maintenance to a minimum.

With the most complete line of quality-built cranes in America to choose from, you can be sure you have the **right** crane for the job—a **"Job-Mated"** crane by Shepard Niles—from 500 lbs. to 500 tons.

For further information on Shepard Niles cranes, and how they can improve your plant operation, write for a descriptive bulletin, and ask to have a Shepard Niles representative call at your convenience.

SHEPARD NILES
CRANE AND HOIST CORPORATION
1406 Schuyler Ave., Montour Falls, N.Y., U.S.A.

MEETINGS

(Continued from P. 15)

stitute headquarters, 600 Fifth Ave., New York 20, N. Y.

American Machine Tool Distributors Assn.—Spring meeting, Apr. 18-20, The Greenbrier, White Sulpher Spring, W. Va. Association headquarters, 1500 Massachusetts Ave., N. W., Washington 5, D. C.

American Society of Lubrication Engineers—Annual meeting, April 19-21, Netherland-Hilton, Cincinnati, Society headquarters, 5 North Wabash Ave., Chicago.

National Assn. of Sheet Metal Distributors — Spring meeting, April 20-22, Deshler Hilton Hotel, Columbus. Association headquarters, 1900 Arch St., Philadelphia.

Rail Steel Bar Assn. — Annual meeting, April 20-22, Palm Beach Biltmore Hotel, Palm Beach, Fla. Association headquarters, 38 S. Dearborn St., Chicago.

Metal Powder Industries Federation—Annual meeting, April 25-27, Drake Hotel, Chicago. Headquarters, 60 E. 42nd St., New York.

Association of Iron & Steel Engineers—Spring meeting, April 25-27, Sheraton Hotel, Philadelphia. Association headquarters, 1010 Empire Bldg., Pittsburgh.

Metal Lath Mfrs. Assn. — Spring meeting, April 28-29, Hotel Tropicana, Las Vegas, Nev. Association headquarters, Engineers Bldg., Cleveland.

MAY

Wire Assn. — Regional meeting, May 4-5, Sheraton Hotel, Philadelphia. Association headquarters, 453 Main St., Stamford, Conn.

American Institute of Steel Construction, Inc.—Engineering conference, May 5-6, Brown Palace Hotel, Denver. Institute headquarters, 101 Park Ave., New York.

TECHNICAL ASSISTANCE

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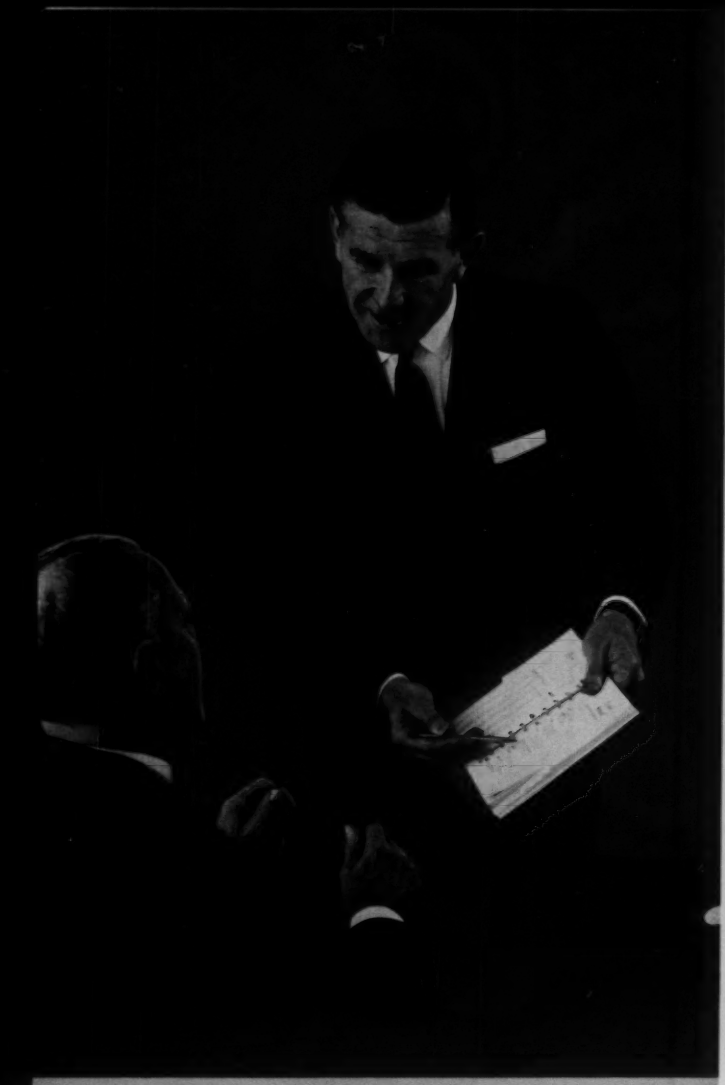
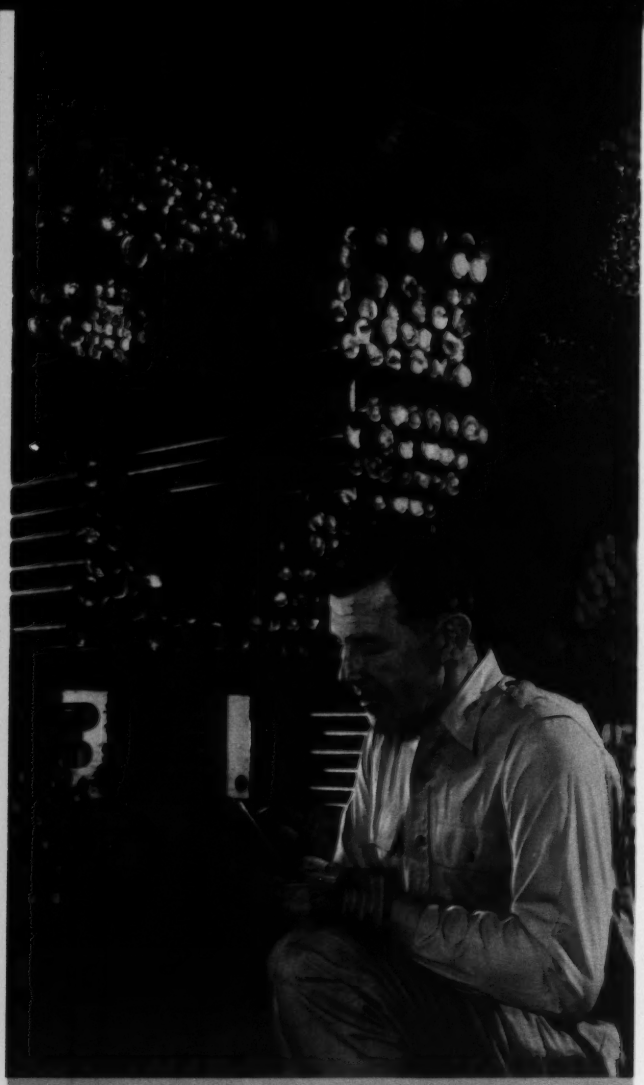
MODERN PROCESSING

QUICK DELIVERY

Your Steel Service Center serves you in all these ways

BETHLEHEM STEEL





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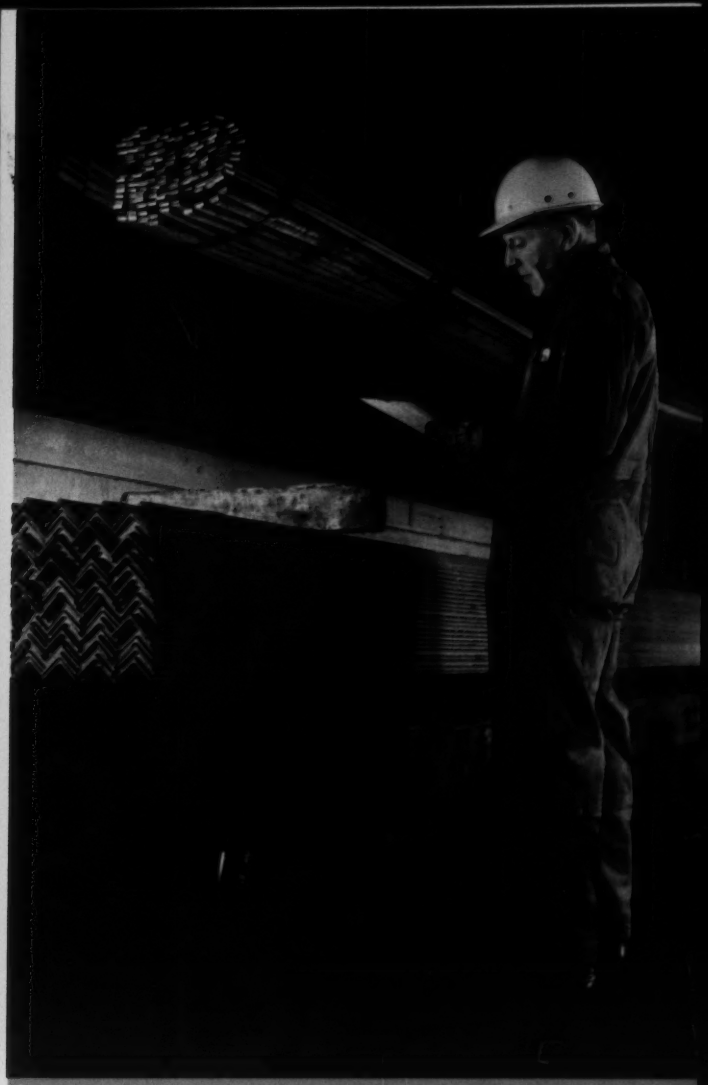
Your Steel Service Center representative will advise you on the selection, fabrication, and application of steel. He is trained for the job. He offers a vast fund of technical experience gained through close cooperation with manufacturers on a great variety of steel application problems.

LARGE STOCKS

Steel Service Centers select their steel stocks to meet the needs of the areas they serve. They store your steel for you. You reduce your inventory costs, release tied-up capital, reclaim storage space for more productive use. And you get the right steel when you need it.

Call your Steel Service Center for the right steel... delivered quickly from stock, ready for use

STEEL SERVICE CENTER INSTITUTE



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You can have your steel delivered ready for use . . . tailored exactly to your needs. Steel Service Centers are usually equipped for services such as flame-cutting, shearing, sawing, slitting, cutting, leveling, testing. You can eliminate expensive handling equipment and labor.

QUICK DELIVERY

Fast delivery can be made by truck from most Steel Service Centers. They can set up delivery schedules any way you want. In emergencies, the steel you need can usually be rushed to you in a matter of hours.

Your Steel Service Center representative is a good man to get acquainted with. He knows steel . . . and what can be done with it. He can draw freely on a staff of technical experts. He's set up to handle your steel needs—especially if you need steel fast, if you need steel only occasionally, or if you need steel in limited quantities.

BETHLEHEM STEEL

BETHLEHEM STEEL

Steel Service Centers stock these Bethlehem products

plates • shapes • bars
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Steel

BETHLEHEM STEEL

HOW TO FIGURE YOUR REAL COST OF POSSESSION FOR STEEL

Insert figures for each cost in appropriate spaces. The resulting totals will give you a true comparison between the "price for inventoried steel" and the cost of buying it from your Steel Service Center.

COST OF POSSESSION FOR STEEL IN INVENTORY

Per ton delivered _____

Cost of capital:
- Inventory _____
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Cost of operation:
- Space _____
- Materials handling _____
- Cutting and burning _____
- Scrap and wastage _____

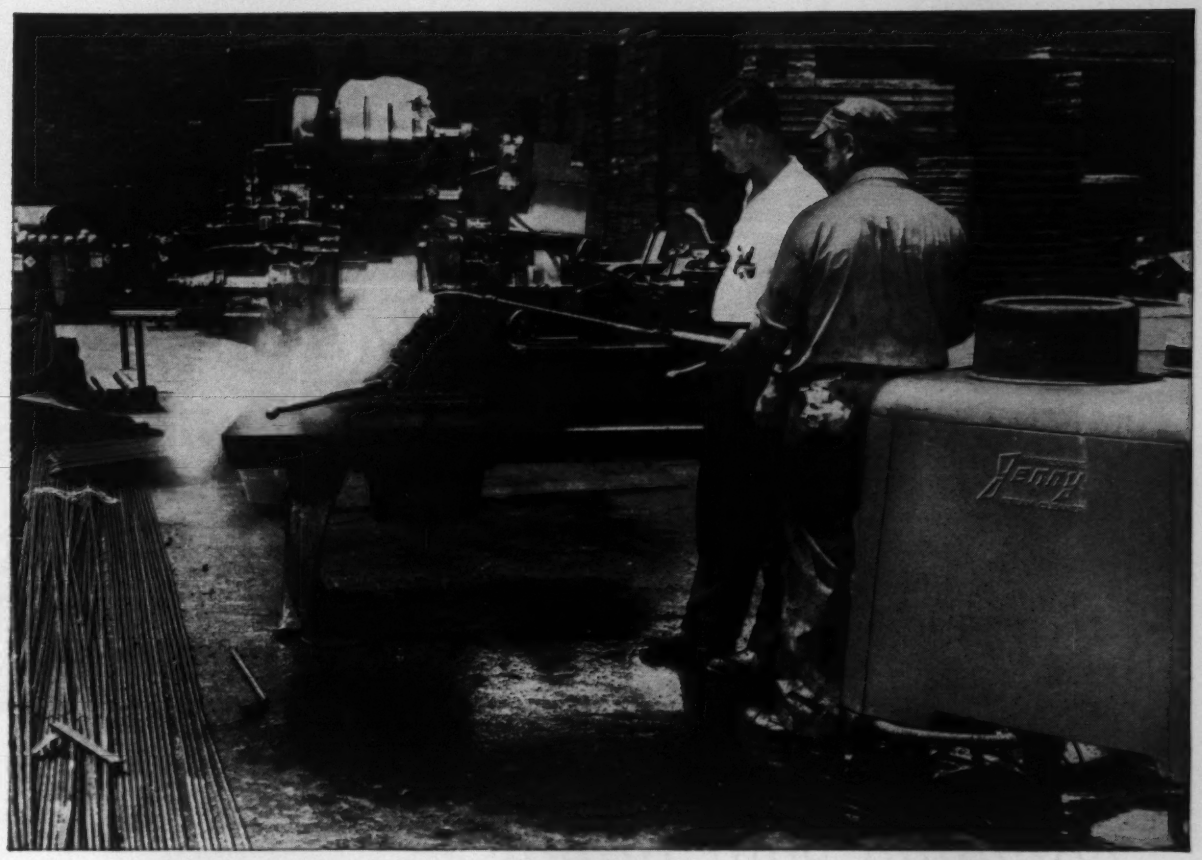
Obsolescence _____
Insurance _____
Taxes _____

TOTAL _____

COST OF FREEDOM-FROM-RISK STEEL FROM YOUR STEEL SERVICE CENTER

Per ton, cut-to-size, and delivered

TOTAL _____



Jenny® Removes 25 Years of Grime– Slashes Tool Reconditioning Time!

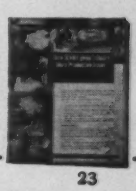
To remove 25 years' accumulation of dirt, grime, and grease from 200 metal working and forming tools, was the problem faced by Mr. John Radzak, Production Manager, Universal Form Clamp Co., Chicago. After trying numerous methods, Hypressure Jenny Steam Cleaner was chosen as the most thorough and economical means of doing the job.

Typical of Jenny's speed and savings was the fact that it cleaned a 100-ton punch press in six hours, as compared with 10 man-days required previously by hand-cleaning methods.

Now, Jenny is used in the company's plant housekeeping program, and it has helped to establish them as one of the cleanest and safest plants in the country.

It will pay you well in profits, production and worker morale to make Jenny the keystone of *your* maintenance and reconditioning programs. With a choice from more than 50 different models of Jenny, including all-electric, oil-fired, or gas-fired types, and ranging in capacity from 35 to 360 gallons per hour, you are sure to get the best Jenny for your cleaning jobs.

Mail the coupon today for additional facts or free demonstration. You'll be glad you did!



23

☐ Please arrange to demonstrate a Jenny.

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Name .....Title .....

Company .....

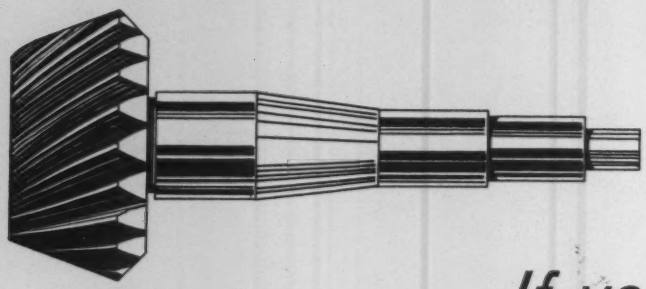
Address .....

City .....Zone.....State .....

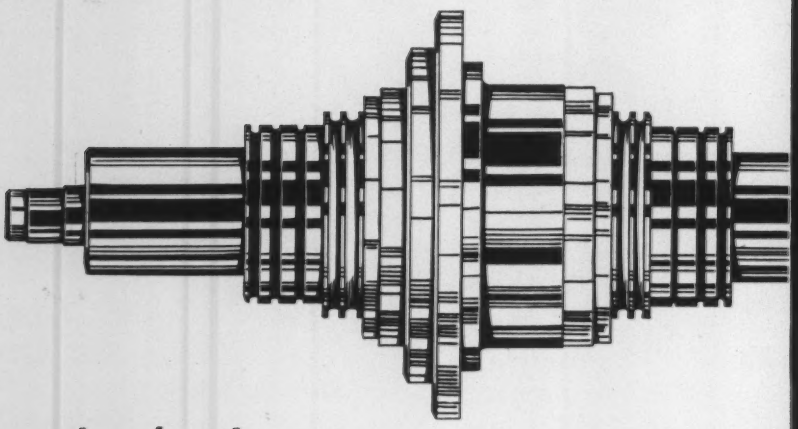
hv

HOMESTEAD VALVE MANUFACTURING COMPANY

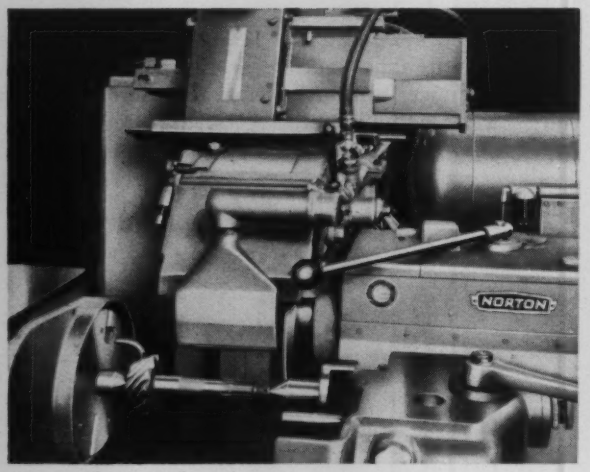
Hypressure Jenny Division—Coraopolis, Pa.
(In Canada: Hypressure Jenny Sales & Service, Ltd., 517 Jarvis Street, Toronto 5, Ont. C.S.A. Approved)



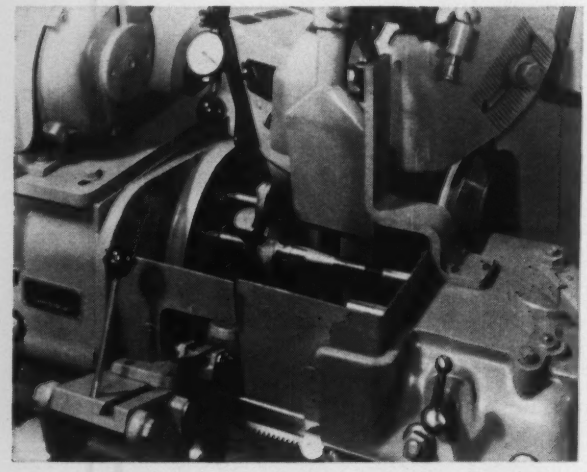
If you grind parts



combine your grinds in NORTON machines...like these



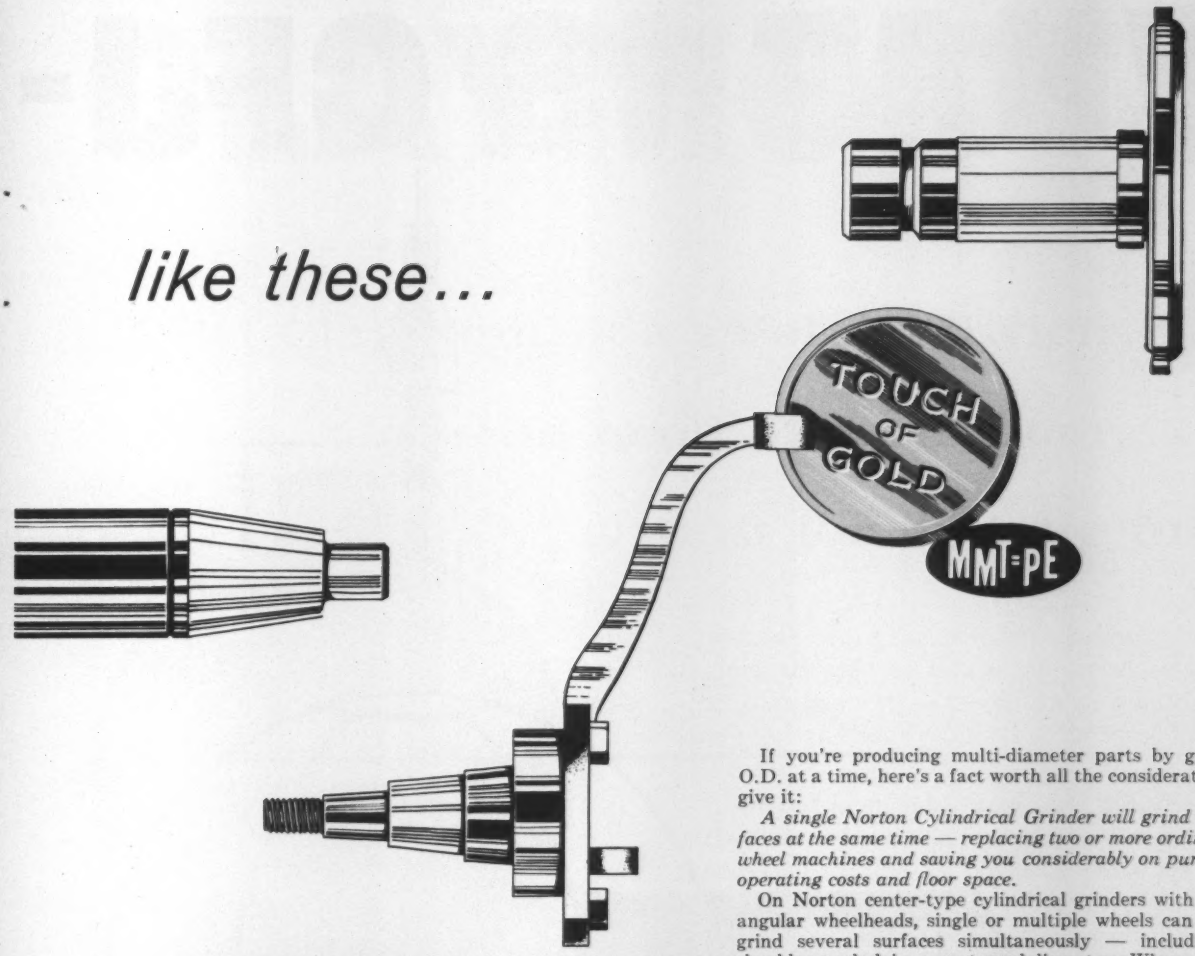
Grinding three stem pinion diameters on a Norton Type CTU Cylindrical Grinder. This multiwheel setup grinds three diameters in a single plunge cut, eliminating the need for separate operations. Norton automatic truing substantially increases the efficiency of multiwheel grinding.



Grinding a steering knuckle on a Norton Type CV-4 Angular Wheelslide Grinder with a dual wheel setup. Norton machines of this type offer unlimited opportunities to save time and effort when grinding several diameters, adjacent radii, and shoulders.

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

like these...



If you're producing multi-diameter parts by grinding one O.D. at a time, here's a fact worth all the consideration you can give it:

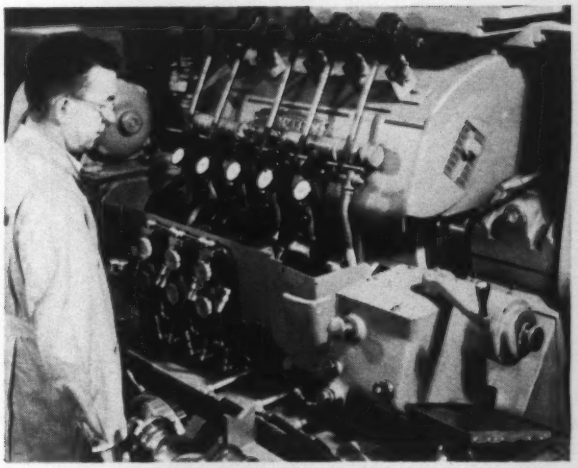
A single Norton Cylindrical Grinder will grind several surfaces at the same time — replacing two or more ordinary single-wheel machines and saving you considerably on purchase costs, operating costs and floor space.

On Norton center-type cylindrical grinders with straight or angular wheelheads, single or multiple wheels can be used to grind several surfaces simultaneously — including tapers, shoulders and plain or contoured diameters. Where wider wheel spacing is required, the heavy duty Type CM-1 Multiwheel Grinder can be used to good advantage for high speed, high production O.D. grinding.

Among the many time-and-money-saving features engineered by Norton for these machines, push-button actuated automatic wheel truing is one of the most outstanding advancements. This device provides close, uniform control of the amount of wheel face removed by the truing diamond, and trues the wheel or wheels either straight or formed, with speed and precision.

Get further facts on how Norton cylindrical grinders are bringing new efficiency and economy to O.D. grinding throughout industry. Your Norton Man, a trained grinding engineer, will be glad to show how these multi-grind, multi-wheel machines can benefit your own production. NORTON COMPANY, Machine Division, Worcester 6, Mass.

District Offices: Worcester, Hartford, Cleveland, Chicago, Detroit. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.



Grinding multiple diameters on a crankshaft, this Norton Type CM-1 Multiwheel Grinder finishes the job in about the same time it would take a conventional machine to grind just one of these diameters. The massive wheel spindle holds a number of 36" wheels, properly spaced, within a wide span of 30".

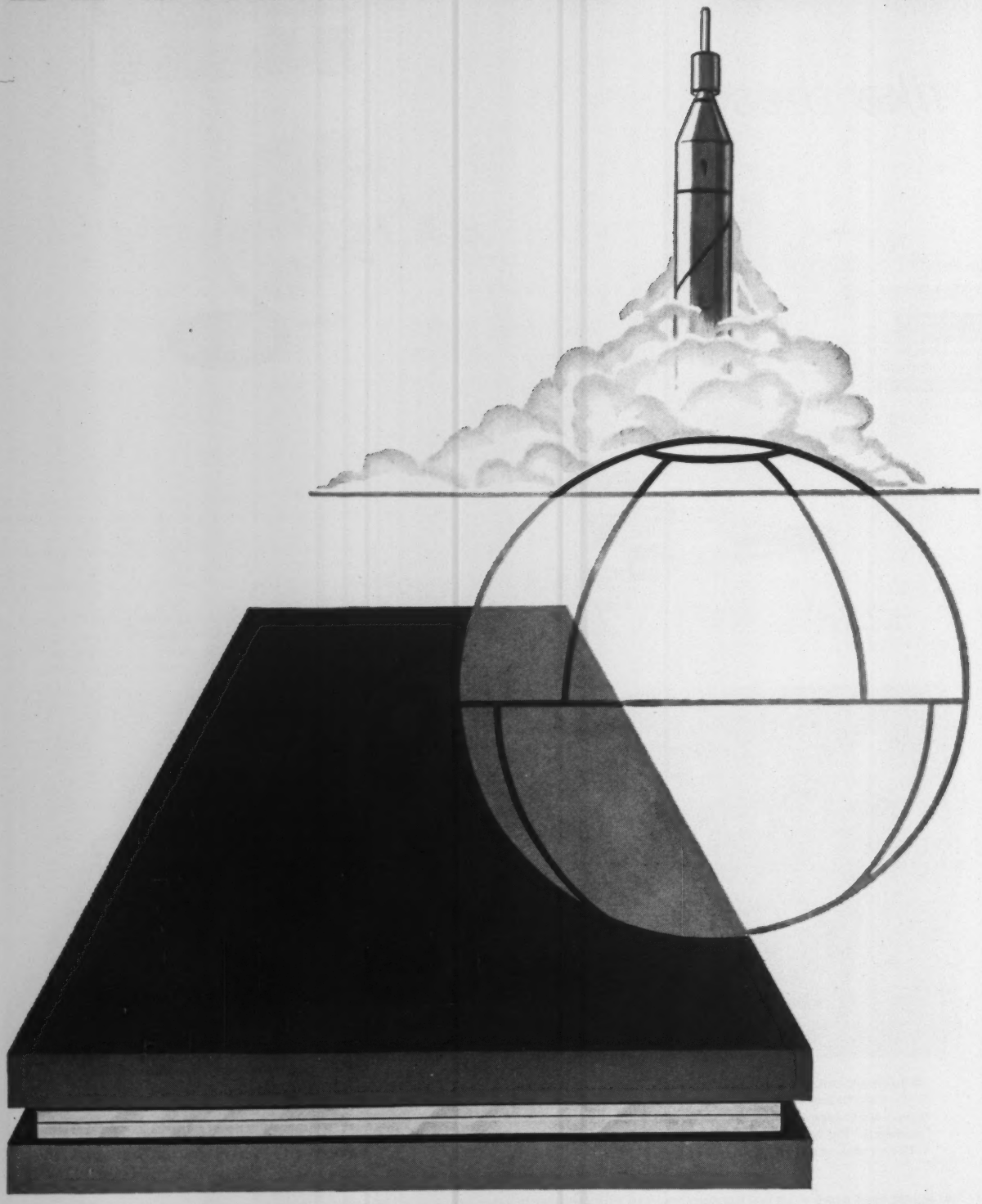
NORTON

MACHINE TOOLS

75 years of . . . Making better products
. . . to make your products better

MACHINE TOOL DIVISION: Grinding and Lapping Machines — **G & E DIVISION:** Shapers • Gear Cutting Machines • Gear Induction Hardeners

WHAT IS CF&I-

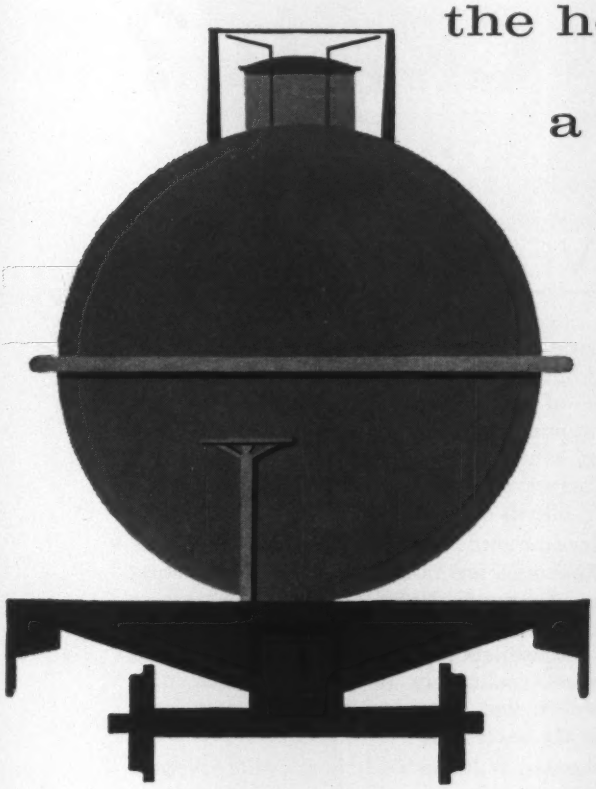


CLAYMONT?

CF&I-Claymont is a steel sandwich...

the head of a tank car...

a vault for missile fuels



Claymont bears the CF&I trademark; it is an important part of this major steel company. Claymont is ability—the ability to manufacture steel plate and plate products to the most demanding customer specifications.

Claymont is an integrated steel mill that rolls carbon and alloy steels into plates of many sizes, shapes and thicknesses. Some of these are made into steel sandwiches — stainless steel plates inseparably bonded to carbon or alloy steel backing plates. These stainless-clad plates are used in many applications requiring corrosion and abrasion resistance. Other plates are spun or pressed into heads, some of which may become integral parts of railroad tank cars. Claymont also makes plates into many special shapes and parts; one example–a container for liquid oxygen rocket fuel.

Claymont invites you to tour our plant whenever you're in the neighborhood. You'll find our modern Fabricated Plate Shop of special interest. In the meantime, you can receive complete information about CF&I-Claymont's facilities and services from any CF&I office.

7620

CLAYMONT STEEL PRODUCTS
THE COLORADO FUEL AND IRON CORPORATION
DENVER • OAKLAND • NEW YORK
sales offices in all key cities

CF&I STEEL

Q. Which is BEST...

ALKYD...VINYL... or ACRYLIC?

A. NONE-for everything!

New finishes, like new drugs, offer many new advantages. *Also like new drugs, however, none is a cure-all for all needs.*

Neither does successful use in one application assure success in another usage with requirements that differ, however slightly.

Some types of acrylics, for example, give important advantages as automotive finishes where expected durability is a relatively few years, where a high gloss is desirable, and where appearance can be maintained by cleaning and waxing.

It has not been established, however, that acrylics offer similar advantages for aluminum house siding where life expectancies up to 14 years and more have been established for other finishes—and where low gloss and self-cleaning are essential to appearance.

For these reasons, Sherwin-Williams *does not and will not* recommend only acrylics—or alkyds or vinyls—to the exclusion of the others.

Sherwin-Williams manufactures, supplies and maintains continuing research in all three types of product-finish formulations—as well as amines, epoxies, polyesters, latices and many others. Sherwin-Williams *has made and sold* acrylic materials as industrial finishes since 1937, alkyds since 1930, and vinyls since 1936.

Recommendations by Sherwin-Williams Laboratories are not made from the starting point of a raw material, but from the starting point of the *requirements of the end use.* With the largest laboratory facilities in the world devoted exclusively to paint research, this approach has been demonstrated to be consistently successful.

Sherwin-Williams Technicians will be pleased to make recommendations on product finishes for any end use—based on consideration of *all* the requirements of the end use, and on proved performance data. See your Industrial Representative or write The Sherwin-Williams Co., General Industrial Div., Cleveland 1, O.

SHERWIN-WILLIAMS

PRODUCT FINISHES

A statement of importance
to users of product finishes
and coated metals, by
The Sherwin-Williams Co.

HOW ALKYDS, VINYLS AND ACRYLICS COMPARE IN IMPORTANT PROPERTIES

PROPERTY	ALKYDS	VINYLS	ACRYLICS
Formability	Good	Superior	Fair
Exposure experience	Excellent	Excellent	Limited
Erosion resistance	Good	Excellent	Unknown
Hardness/flexibility	Good	Excellent	Good
Chemical resistance	Good	Excellent	Excellent
Pressure-marking resistance	Excellent	Excellent	Good
Economy of cost	1 (Lowest)	2	3

Now! Finish parts up to 100 times faster, The AIR-

...the latest method for CLEANING,

radiusing, fine-finishing, coloring and burnishing all metal and metal alloy parts, many suitable plastic and ceramic items. The Pangborn Air-Cushioned Vibratory Finishing Machine—culmination of Pangborn's years of experimentation and refinements*—obsoletes precision barrel finishing.

The Pangborn Air-Cushioned Vibratory Finishing Machine gives you wider range of application, larger payloads and greatly-reduced time cycles resulting in tremendous savings. It easily handles parts too delicate and intricate to finish by other methods . . . works on shielded areas and interior surfaces . . . does coarser jobs faster and better *with impressive cost reductions.* You'll find it perfect for castings, forgings, stampings, machined and pressed parts!

Available in 1½, 3, 6, 12 and 18 cu. ft. net capacity sizes. Send parts with exact finish specifications for sample processing in our laboratory . . . witness production runs of your work.

*Pat. No. 2,422,786; June 24, 1947

Benefit from the expert knowledge and services of Mr. William E. Brandt, Vibratory Finishing Division.

Mr. William E. Brandt

better and at a greatly reduced cost!

secret—

CUSHIONED

DESCALING, DEBURRING, GRINDING,

THE PANGBORN AIR-CUSHIONED VIBRATORY FINISHING MACHINE OFFERS THESE EIGHT IMPORTANT ADVANTAGES:

- Works up to 100 times faster than conventional methods; does more work BETTER at LOWER COST
- Does work impossible to do by barrel finishing or other means
- Has wider range of application
- Saves manpower, floor space and operating overhead
- Sturdiest and most compact vibrator on the market
- Air cushion support and suspension for automatic leveling and amplitude control supplants spring suspension systems subject to fatigue
- Standard basic machines are equipped with mechanically variable speeds
- Floor vibration entirely eliminated making possible (for the first time) second floor mounting

Send coupon below to: Vibratory Finishing Division, PANGBORN CORPORATION, 1500 Pangborn Blvd., Hagerstown, Maryland.

Pangborn
OF HAGERSTOWN

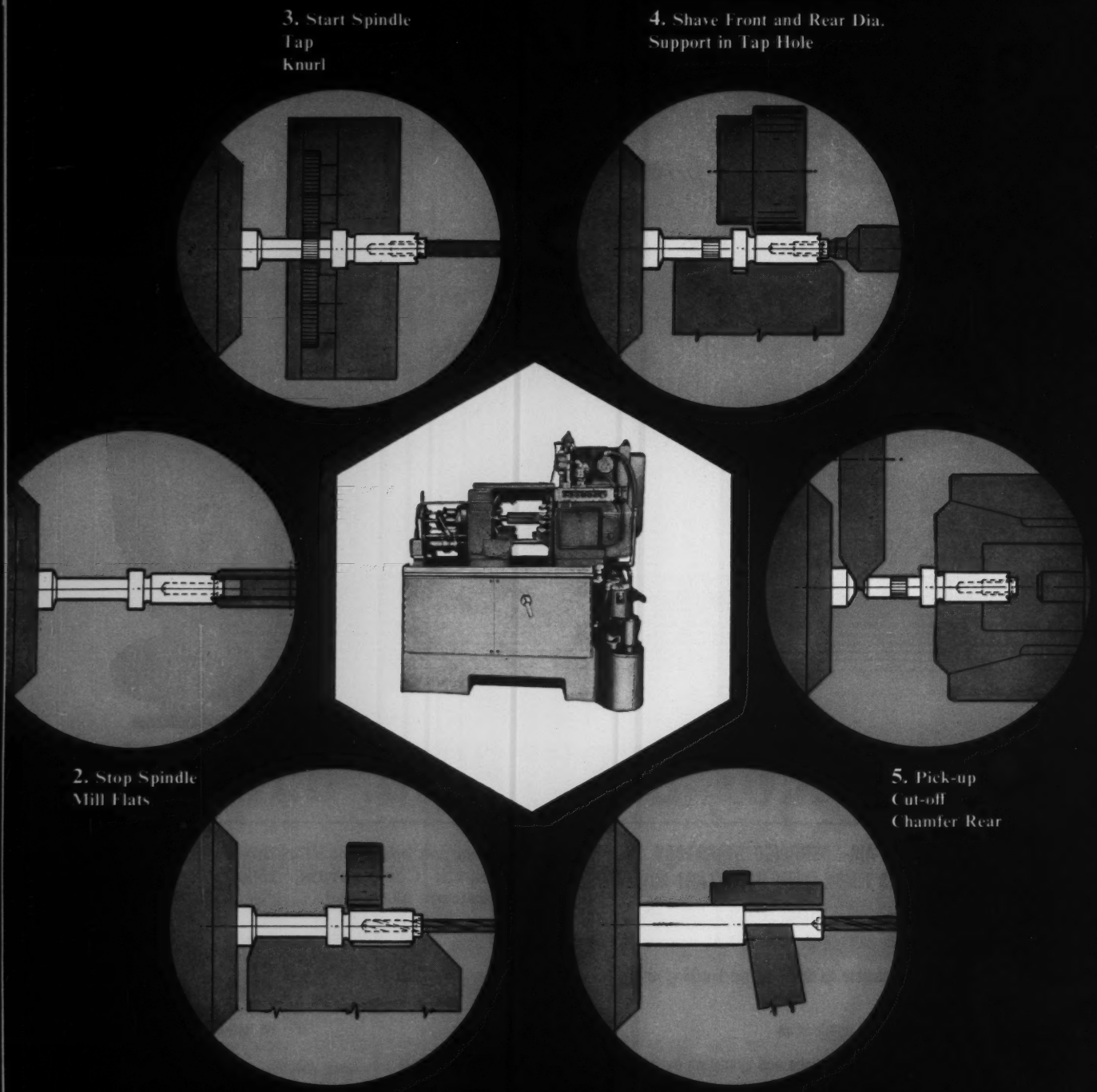
☐ Please send details on Pangborn Air-Cushioned Vibratory Finishing Machine.
☐ Please have representative see me about a laboratory demonstration on my work.

Name.....Position.....

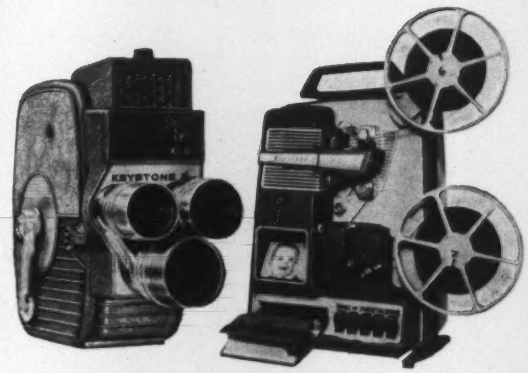
Company.....

Address.....

City.....Zone....State.....



9 operations in 3.8 seconds . . . one of the typical parts produced by Keystone Mfg. Co. on the 7/16" RA-6 Bar Automatic



85,000 Pieces Per Day And No Rejects

Production *facts* tell a typically impressive story of Acme-Gridley machining efficiency at Keystone Manufacturing Company, Boston, Mass.

"We have five 7/16" RA-6 Spindle Bar Automatics", states a Keystone executive. "Everyday, they produce an average of 85,000 precision parts for our cameras and projectors . . . and yet, there are literally no rejects. As a result of this consistent conformance to our tough tolerances, scrap losses have been wiped out and inspection time reduced to an all time low. What's more, because Acme-Gridleys produce in a single set-up jobs otherwise requiring secondary machining, we've cut production costs."

Dramatic and *tangible* savings like those realized by Keystone are commonplace with Acme-Gridleys. Such features as a wide open tooling zone, direct camming and independently operated tool slides can help you achieve higher mass production efficiency at lower cost. We'll be happy to supply complete information on the world's most complete line of multiple and single-spindle automatic bar and chucking machines. Call, write or wire.

National Acme's "Zone of Responsibility" includes all phases of cost reduction

Check YOURS . . . Then Check National Acme

Direct Costs: these include direct dollar savings as realized by Keystone Manufacturing Co. . . . an "everyday" job for Acme-Gridleys. **Indirect Costs:** effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc. **Product Redesign:** teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities. **Direct Material Costs:** our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems. **Make-or-Buy Reviews:** in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment. **Spot Modernization:** pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.

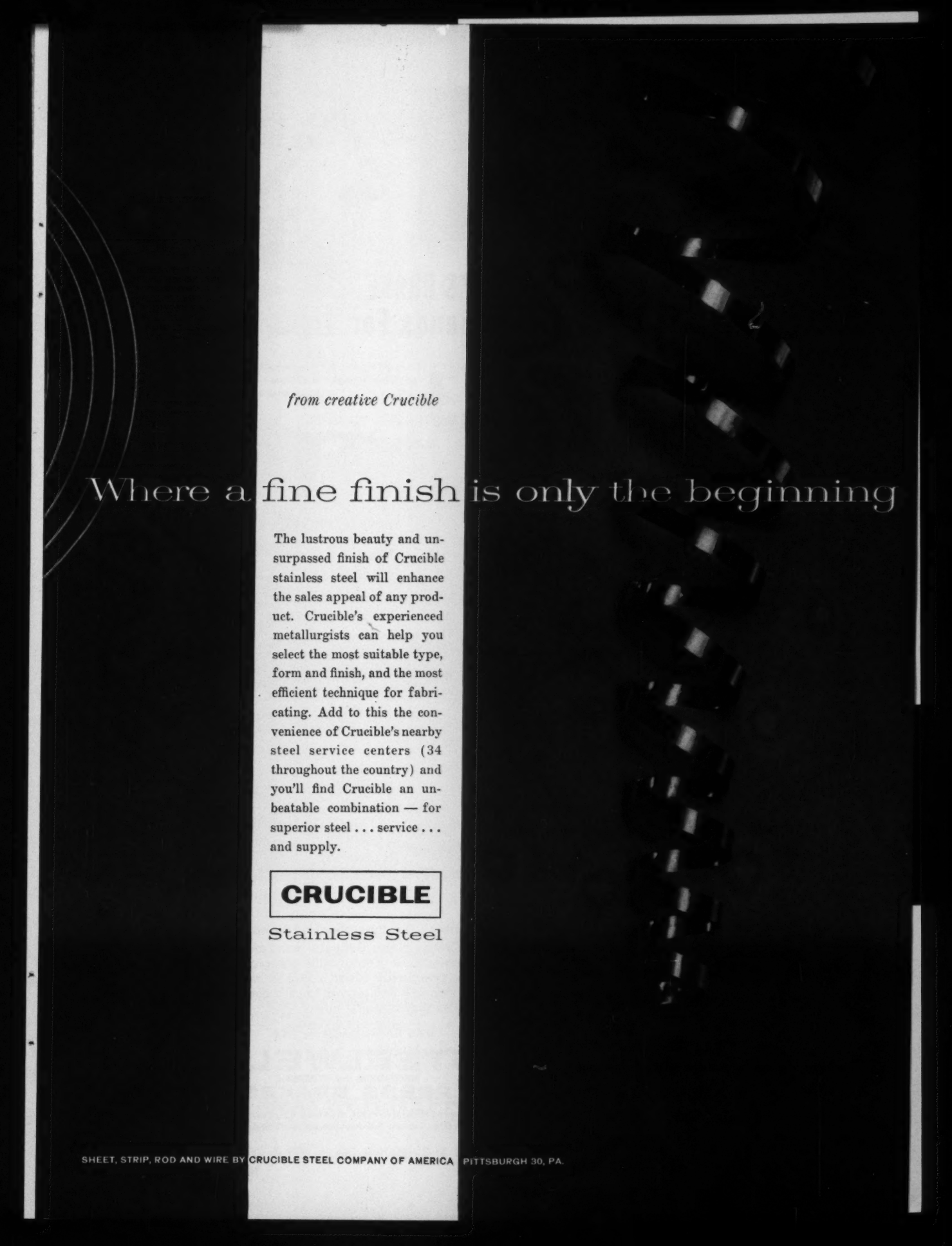
National Acme

The National Acme Company
175 E. 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.

MMT·PE

GOWN BY FON TAYNE; STAINLESS



from creative Crucible

Where a fine finish is only the beginning

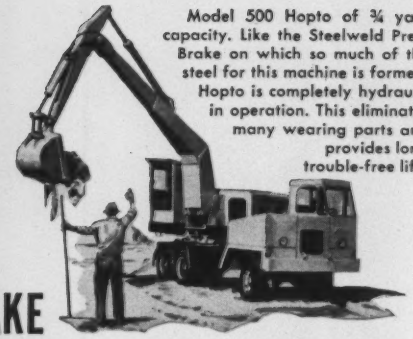
The lustrous beauty and unsurpassed finish of Crucible stainless steel will enhance the sales appeal of any product. Crucible's experienced metallurgists can help you select the most suitable type, form and finish, and the most efficient technique for fabricating. Add to this the convenience of Crucible's nearby steel service centers (34 throughout the country) and you'll find Crucible an unbeatable combination — for superior steel . . . service . . . and supply.

CRUCIBLE

Stainless Steel

SHEET, STRIP, ROD AND WIRE BY CRUCIBLE STEEL COMPANY OF AMERICA PITTSBURGH 30, PA.

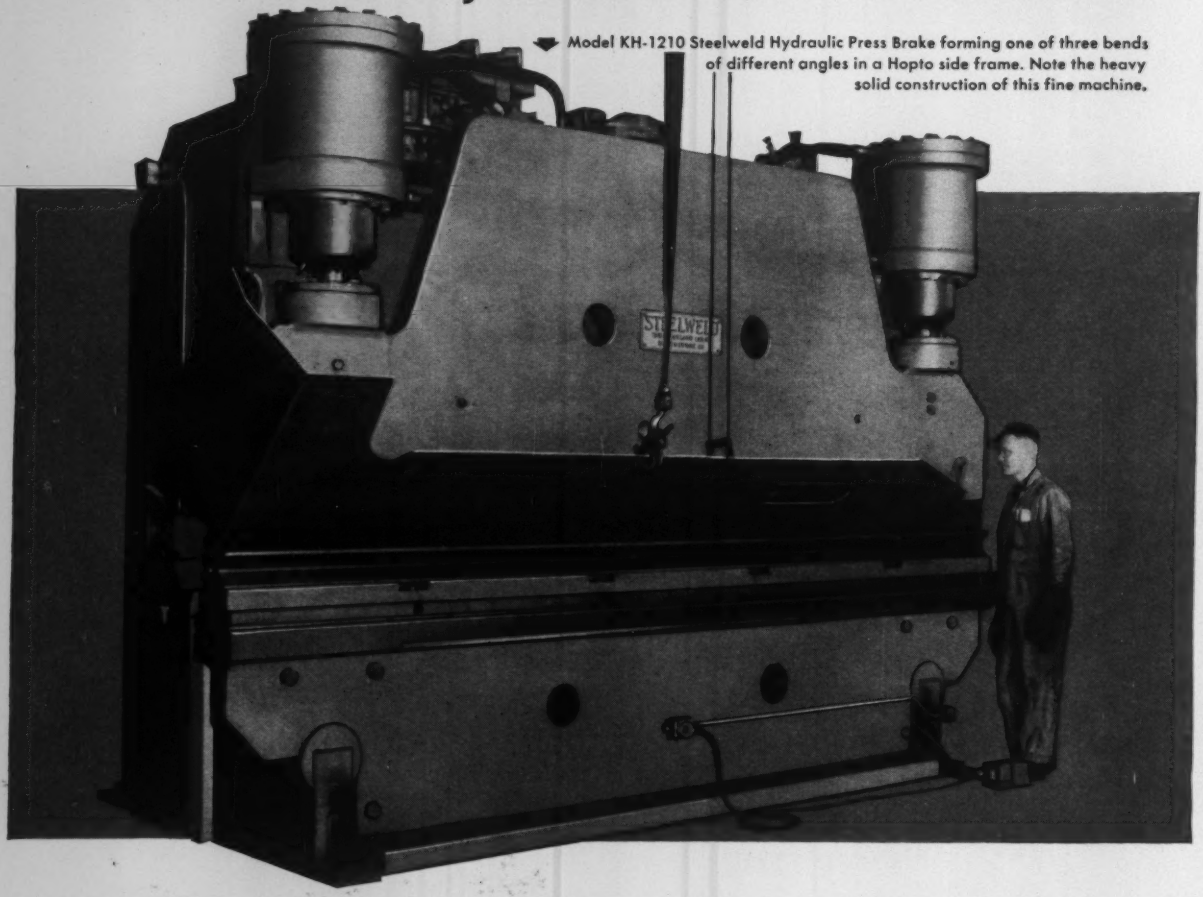
Practically all bends in the steel in these booms for Model 500 Hoptos were produced on the press brake below.



Model 500 Hopto of ¾ yard capacity. Like the Steelweld Press Brake on which so much of the steel for this machine is formed, Hopto is completely hydraulic in operation. This eliminates many wearing parts and provides long trouble-free life.

STEELWELD HYDRAULIC PRESS BRAKE Forms 90% Of Heavy Plate Bends For Hopto Backhoes

Model KH-1210 Steelweld Hydraulic Press Brake forming one of three bends of different angles in a Hopto side frame. Note the heavy solid construction of this fine machine.



A 400 ton Steelweld Hydraulic Press Brake is a key machine in the production of Hopto Backhoes at The Warner & Swasey Company, Badger Division, Winona, Minnesota. 90% of the many bends on various thickness plates required in the Hopto construction are made on the Steelweld machine.

The press brake has speeded production enormously because bends of different degrees can be made quickly and repeatedly on a simple set of four-way dies by presetting a ram adjustment. This determines the length of ram travel and makes possible changing the setting from one angle to another in about the time required to snap one's fingers.

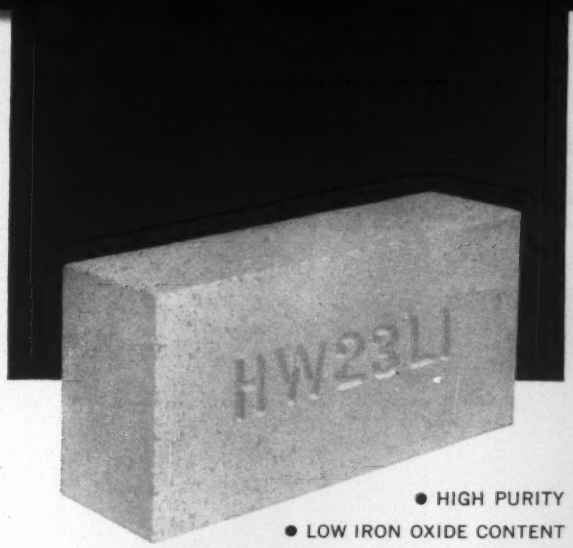
The machine delivers accurate bends to close tolerances. It is easy and safe to operate. Although it is practically always in use, no time is lost for servicing. It has proven to be a big help in lowering production costs.

Write for free booklet No. 2024

STEELWELD
MECHANICAL and HYDRAULIC
PRESS BRAKES

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

STEELWELD MACHINERY DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 4879 E. 281 ST. • WICKLIFFE, OHIO



- HIGH PURITY
- LOW IRON OXIDE CONTENT

HARBISON-WALKER

HW23LI

insulating fire brick particularly suited for controlled atmosphere furnaces

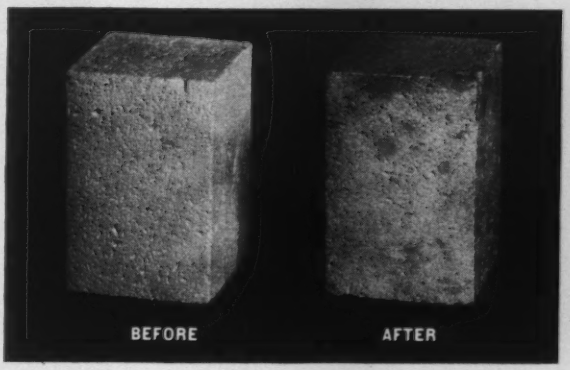
Harbison-Walker H-W 23 LI insulating fire brick produced primarily for controlled atmosphere furnace requirements contains in total not over 2% of accessory oxides, including iron oxide, which are subject to the influence of the usual furnace gas atmospheres. This enhanced property of resistance to the detrimental action of gases is accomplished without any sacrifice of other desirable physical characteristics.

Very low bulk density (27 to 30 pcf), augmented by minute pore size, accounts for its high insulating value. Exceedingly fine texture contributes to desirable glazing and to its good resistance to penetration by volatile fluxes.

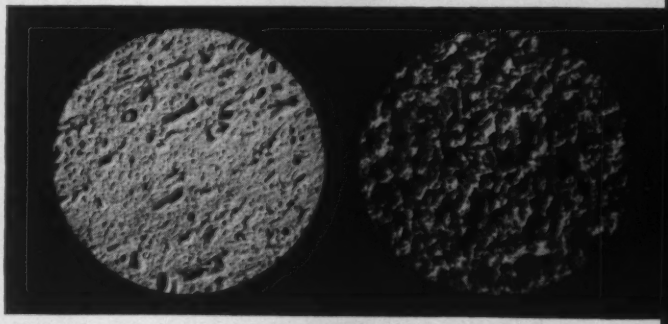
In the prescribed A.S.T.M. 210-46 test for 2300°F. insulating brick, the H-W 23 LI brand, when held at the maximum temperature for 24 hours, shows zero linear change.

The crushing and transverse strengths of H-W 23 LI are adequate for sustaining its weight and the thrust imposed in arches of relatively wide spans, up to its temperature limit.

The optimum combination of physical and chemical properties adapt H-W 23 LI fire brick to a wide variety of uses, in addition to controlled atmosphere furnaces. Write for complete specific information. A sample will illustrate its excellent workmanship.



H-W 23 LI before and after a 500-hour test in an atmosphere of 95% + carbon monoxide (per A.S.T.M.: C288-56), illustrating the high degree of immunity to disintegration by carbon deposition. In this test of long duration at the most critical temperature, H-W 23 LI was unaffected.



Magnification x2, illustrating pore size of H-W 23 LI.

Magnification x2 of another 2300°F insulating fire brick.

Harbison-Walker insulating products also include all conventional classes for service up to 3000°F.

Modern packaging in sturdy cartons assures safe transportation and efficient handling. Packed 25 to a carton.

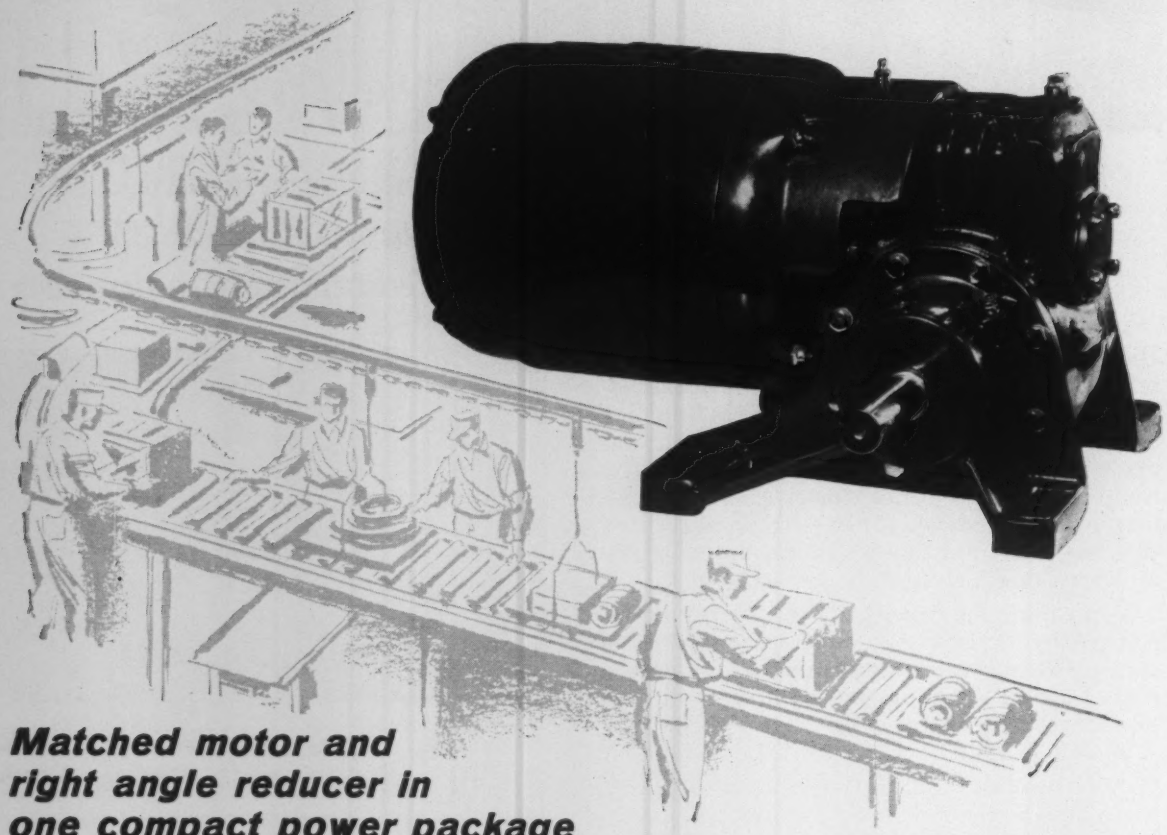
HARBISON-WALKER REFRACTORIES COMPANY
AND SUBSIDIARIES
General Offices: Pittsburgh 22, Penna.

World's Most Complete Refractories Service

HW 60-6

MASTER GEARMOTORS

simplify applications—save space



Matched motor and right angle reducer in one compact power package

Reduction of engineering and assembly cost . . . elimination of separate components . . . are basic in this Master Right Angle Gearmotor. Consider these specific advantages:

1. No high speed coupling.
2. No V-belts or chains and sprockets.
3. Takes up less space—reduces mounting plates.
4. Special flange or face mounting can eliminate low speed coupling.
5. Saves aisle space . . . drives around the corner.
6. Wide acceptance by machine builder and user.

Master Gearmotors are built with ratings from ⅛ to 125 h.p. . . . in right angle, parallel or in combination. Right angle ratios are available to 96:1; parallel 120:1.

Electrical and mechanical modifications give you a maximum choice—vertical, horizontal, and flange mountings; output shaft over, under, left or right. These gearmotors can be supplied with built-in accessories: a fluid coupling for hard-to-start loads or cycling loads; a brake for fast stops and positive holding.

Call your nearest Reliance Sales Engineer. Let him tell you why more Master Gearmotors are in use today than any other make. E-1643

Product of the combined resources of Reliance Electric and Engineering Company and its Master and Reeves Divisions

RELIANCE ELECTRIC AND ENGINEERING CO.

DEPT. 24A, CLEVELAND 17, OHIO
Canadian Division: Toronto, Ontario
Sales Offices and Distributors in Principal Cities

Duty Master A-c. Motors, Master Gearmotors, Reeves Drives, V★S Drives, Super 'T' D-c. Motors, Generators, Controls and Engineered Drive Systems.

thanks to FRASSE tubing!

Seamless Mechanical Tubing
Welded Mechanical Tubing
Pressure & Hydraulic Tubes
Centrifugally Spun Tubing
Stainless Seamless Tubing
Stainless Welded Tubing
Stainless Pipe, Valves & Fittings
Aluminum Tubing, Pipe & Fittings

Call FRASSE 1st for tubing

Spectators gasped when this sprint car skidded—at 95 m.p.h.—into a series of flips that seemed certain to demolish both car and driver. Yet—miraculously, the driver walked away from the wreck with only minor bruises. His roll bar—made from Frasse tubing—had shielded him by taking the full impact of the car...not once, but *four times.*

The capacity to take such abuse is inherent in seamless tubing. It combines the ability to absorb and localize shock, with the ultimate in strength and rigidity in proportion to size and weight. Then too, it possesses superior welding and machining properties. That's why more and more engineers specify seamless tubing... for structural and mechanical applications.

Every tube in Frasse stocks meets the rigid quality specifications set by Frasse tubing specialists. So, if you use tubing in your product —and want trouble-free quality in a hurry...*it will pay to make Frasse your source for tubing.* There's a size on hand to meet every need...delivery is immediate...and Frasse engineers are available to assist you with any problem involving a tubular product.

Peter A. Frasse & Co., Inc.

AMERICAN STEEL WAREHOUSE ASS'N — YOUR STEEL SERVICE CENTER

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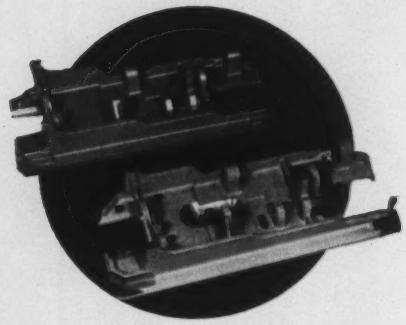
Sub-contracting precision parts, assemblies and machines like these... is our business!

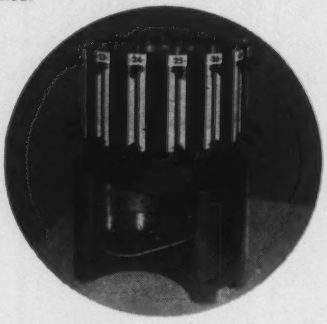
(but we want more of it)

We'd also like to prove to you what our completely integrated manufacturing facilities* can mean to you in terms of lower costs, faster delivery, and complete satisfaction.

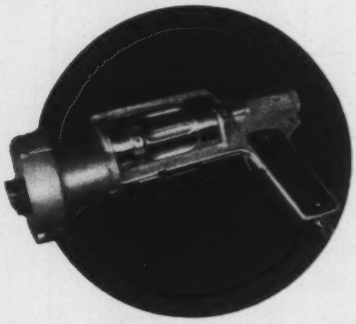
TMW's facilities and 65 years' experience in high-precision (tolerances to tenths) manufacturing are available to you *now*, on a short or long-term basis. For details or a new Facilities File Folder, call or write today.



A TMW gray iron casting before and after precise machining, annealing and finishing operations were performed.



Paint dispenser was economically mass produced for a major manufacturer in TMW's modern shops.

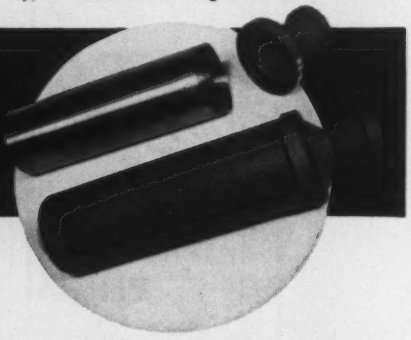


"The world's first and only automatic stud fastener" . . . (another example of TMW precision machining and assembly) carries a LIFETIME guarantee.

* Includes 1,000,000 sq. ft. of manufacturing space, 1200 *modern* machine tools, completely mechanized foundry (one of the world's largest), 3000 skilled craftsmen with a corps of top designers and engineers.

TEXTILE MACHINE WORKS

Contract Division • Reading, Pennsylvania



Jato units, used on the "Honest John" rocket to make it spin, are machined to ±.0002" tolerances and hydrostatically tested to meet strict government specifications.

A NEW Band Saw Machine that Cuts Down Cut-off Costs

Get the Complete Dollars-and-Cents FACTS . . .

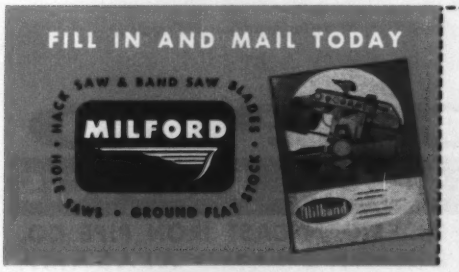
. . . and see for yourself why the many exclusive design and construction features built into the Milband Band Saw Machine Tool will give you important benefits like longer blade life, faster cut-off sawing, increased production, greater accuracy and lower cost-per-cut.

The Milband is specifically designed and built to provide the extra ruggedness, rigidity and construction refinements needed to operate high speed band saw blades with full efficiency. Facts about this machine – including comparative time-and-cost figures obtained from actual performance tests – are featured in the new circular shown here. Use the handy coupon below to send for your free copy . . . today! There's no obligation, of course.

MILBAND MACHINE TOOL DIVISION

THE HENRY G. THOMPSON & SON CO., NEW HAVEN 5, CONNECTICUT

Saw Specialists for Over 80 Years



THE HENRY G. THOMPSON & SON CO.
278 Chapel Street New Haven 5, Connecticut

Gentlemen: Please rush my free copy of Thompson Circular No. 502, giving the complete facts on fast, low-cost production cut-off sawing with the MILBAND Band Saw Machine.

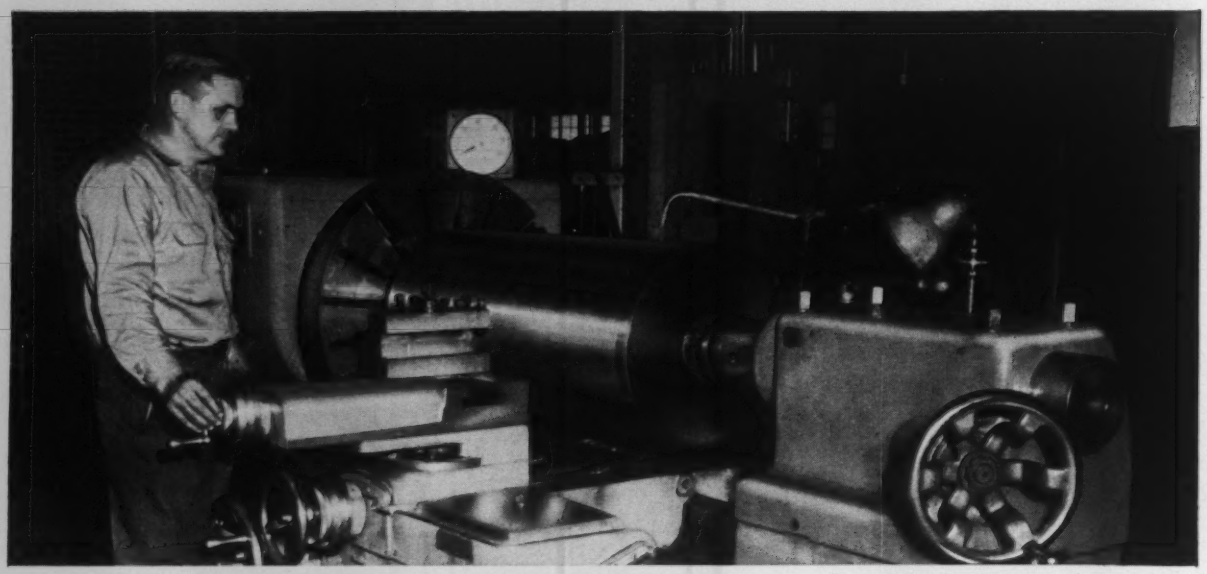
Name_____ Position_____

Company_____

Co. Address_____

City_____ Zone____ State_____

A NEW "ROLL" FOR OLD GLORY!



ACIPCO CENTRIFUGALLY SPUN ROLL USED IN PRINTING NEW 50-STAR FLAG

Here is an interesting application for ACIPCO centrifugally spun steel tubing. The above view shows an ACIPCO Type 1025 steel roll — 19" in diameter and 44" in length — being machined prior to copper plating. The roll was subsequently engraved with the 50-star pattern, and then utilized for printing multiple reproductions of our new flag on fabric.

Wherever tubular steel applications exist . . . ACIPCO spun steel tubes serve. Completely equipped to produce a wide variety of centrifugally spun and statically cast products, ACIPCO can serve your requirements more efficiently and economically because all its facilities are "under one roof."

For expert consultation on centrifugally spun tube applications in your field . . . call on ACIPCO.

VERSATILE ACIPCO CENTRIFUGALLY SPUN STEEL TUBES

SIZE RANGE
Lengths up to 40 feet have been produced to meet modern machinery requirements. O.D.'s from 2.25" to 50"; wall thicknesses from .25" to 4".

ANALYSES
All alloy grades in steel and cast iron, including heat and corrosion resistant stainless steel, plain carbon steel and special non-standard analyses.

FURNISHED
As cast, rough machined, or finish machined, including honing. Complete welding and machine shop facilities for fabrication.

Write for free illustrated catalog.

ACIPCO
SPECIAL PRODUCTS
DIVISION OF AMERICAN CAST IRON PIPE CO.
BIRMINGHAM • ALABAMA

SPACE SPENDING WILL REACH NEARLY $8 BILLION in the 1961 fiscal year. And it may go as high as $10 billion if Congress insists the nation's rate of space research should be stepped up. Military missile and space spending will be about $7 billion, civilian space activities will be more than $900 million. Over the next 10 years, civilian space spending will run $12 billion to $15 billion.

FOREIGN INDUSTRIAL RISE is indicated as six-member European Community reports 58 pct increase in six years. Metalworking increases by countries: Belgium, 32 pct; France, 70 pct; W. Germany, 90 pct; Italy, 55 pct; Netherlands, 65 pct.

APPLIANCE SALES ARE HEALTHY according to manufacturers. In spite of pessimistic earlier reports, business is expected to match 1959. And manufacturers are sticking to forecasts for an overall gain in major appliance sales in 1960, as dealer-distributor stocks run ahead of factory orders.

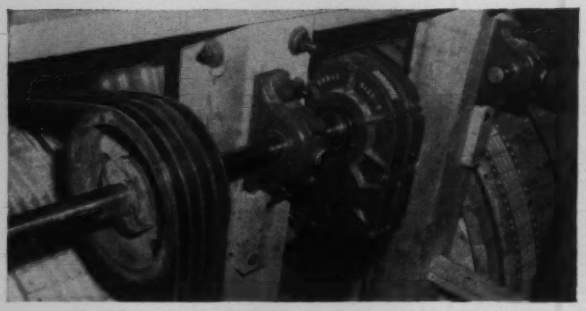
NO MAJOR WEAKNESSES IN STEEL MARKET noted by L. S. Hamaker, assistant vice president of sales, Republic Steel Corp. High auto dealer inventories must be viewed in light of three new lines of cars, reminds Mr. Hamaker. But a two-to-one ratio of steel imports over exports is not a market weakness but, "a fact of life we will have to live with."

CONSUMER INCLINATIONS TO BUY "MUCH IMPROVED" since steel strike, says the Survey Research Center of the University of Michigan. The number of consumers who think "it's a good time to buy" automobiles and other durable goods is "much higher" now than a year ago, according to the center. Also reported: A general improvement in ability to buy. The one dark cloud: Inflation.

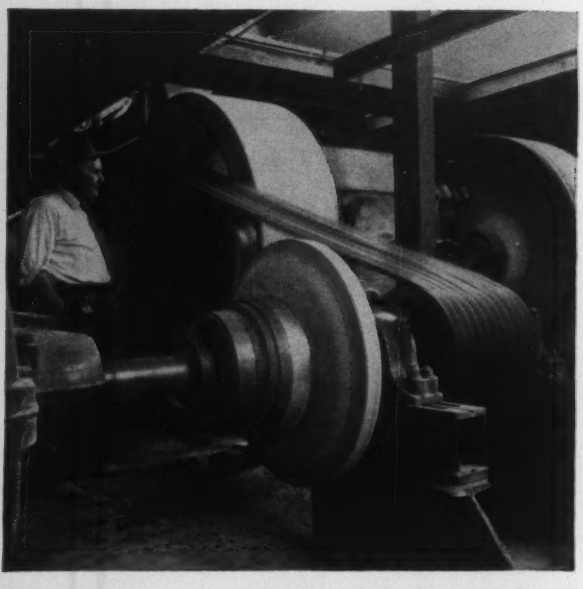
THE INDEX OF THE AMERICAN GEAR MANUFACTURERS ASSN. shows a 14.5 pct increase in February over January. The February index was 278.6 (1947-49=100) for new bookings. This is above the 1959 average of 234.7. The index of shipments also rose in February to 230.2, up from 207.3 in January.

HEATING EQUIPMENT SALES RISE SEEN by industry if some of the trade restrictions applied by foreign governments are eased. Sales in 1959 were $22.5 million.

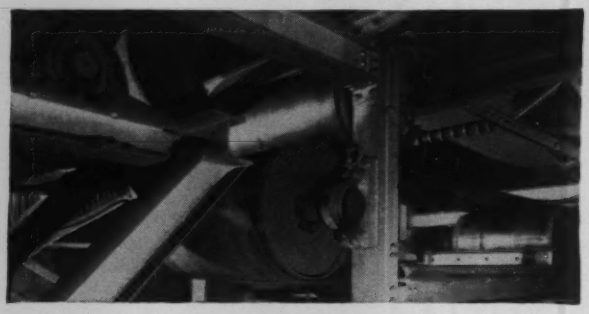
How Dodge pillow blocks with Timken® bearings give longer life with less maintenance



1. Two 2 7/16" Dodge Special Duty pillow blocks equipped with Timken® tapered roller bearings, support the line shaft driving six by eight foot tanning drums. The tapered design of Timken bearings enables them to take both radial and thrust loads in any combination.



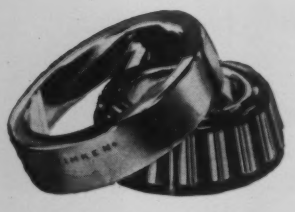
2. The crusher at a trap rock and asphalt plant runs faster, gives more production now that Dodge Double Interlock pillow blocks on Timken bearings are installed. The Timken bearings in these blocks give full-line contact between rollers and races for greater load carrying capacity.



3. The Timken bearings in All-Steel Dodge pillow blocks must stand up under adverse operating conditions found when sintering metals. One major advantage of Timken tapered roller bearings is their ability to hold housings and shafts concentric, thus keeping lubricant in, dirt and dust out.

The photo at right shows the Dodge All-Steel pillow block Timken bearing equipped. The specially designed bearing has a tapered bore with self-aligning spherical outer surface—never needs adjustment.

There's a Dodge pillow block equipped with Timken bearings to fill every engineering need: All-Steel, Type "E", Double-Interlock, Type "C" and Special Duty. And with Timken bearings, space consuming thrust devices are not needed. Look for Timken bearings in all the machines you buy or build. They're the symbol of quality. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.



BETTER-NESS rolls on

TIMKEN®

tapered roller bearings

Aerospace Shoots at the Top

Future Space Research Will Cost Billions

U. S. missile and space projects will cost nearly $8 billion in the 1961 fiscal year.

Future program will need even greater expenditures. Space spending could become industry's top spender. — By H. R. Neal.

▪ "How soon will man land on the moon?"

Space experts counter the question by asking another: "How soon do you want to get there?" And they follow this with another: "Why?"

Man-on-the-moon has become an international race. And the U. S. currently trails Russia. But putting a man in space and finally landing him on the moon will only mark the beginning of the space age.

Aerospace is already a billions-of-dollars-a-year business. And the segment that is growing the fastest is the field of rockets, missiles, and space vehicles, and related equipment.

Defense Spending—Since World War II, the U. S. has undertaken more than 200 missile and space programs. They range from the A-4 (Air Force drone) to the Zuni (Navy air-to-air rocket). Yet the industry is still in its infancy. The process of growing up will require increasingly more billions of dollars in the years ahead.

Dept. of Defense's obligational program for missile systems will take nearly $7 billion in the 1961 fiscal year. In 1956, only $2.3 billion was spent on missile systems. (See chart, p. 48.)

The figure covers all procurement, research and development, construction, and other expenditures to bring a missile or system to operational status. And it includes the cost of the missiles. But it doesn't include military pay for personnel, or the cost of operation and maintenance of bases or facilities.

Civilian Spending — In addition, the National Aeronautics and Space Administration, the nation's civilian-scientific space agency, is seeking $915 million for its operations next year.

The nation, then, will spend about $8 billion for military and sci-

LONG-DISTANCE CALLING: At midnight today, NASA's Pioneer V satellite was 3,756,000 miles from the earth, still sending back scientific data. The sphere is shown getting its pre-launch check.

NEXT WEEK:

Aerospace Engineering

Part II of this series on the Aerospace industry will be a direct report on engineering problems as seen by the people who face them. Origin will be the Annual Aeronautical Meeting of the Society of Automotive Engineers.

entific missile and space activities. And it is possible for this spending to climb higher before the next fiscal year is over.

The size and importance of space spending can be assessed by looking at the auto industry, long considered one of the big spenders in industry.

Challenge the Giants—Wholesale value of U. S. passenger cars produced in 1959 reached $10.5 billion. Trucks and buses added another $2.4 billion, for a total industry output value of $12.9 billion. Only the $14.5 billion value of 1955, and 1957's $13.3 billion outputs were greater.

But space spending is rapidly closing in on this giant industry and could challenge it for dollar leadership in the years ahead. The problem of landing a man on the moon is as much a problem of money as it is of time or technology, according to missile and space experts.

As one space scientist notes: "The rate at which we are advancing in space technology is to a large extent determined by what the Russians are doing."

Why Space Research — Missile and space expenditures have increased rapidly since Russia staged its first space spectacular. But Russian successes have had the positive effect of making the nation space conscious. And they forced the U. S. to ask itself the question that might have waited for years. Is there a reason to go into space?

Defense requirements come first. But, currently, they don't depend on capabilities in outer space. Secretary of Defense T. S. Gates, Jr., recently pointed this out to a Senate Committee on Aeronautical and Space Science.

However, he continued, "We are vitally interested in the development of larger boosters because the future may well bring specific military requirements for them. Our military satellite program is progressing as a matter of priority and is well supported by the propulsion systems of our ballistic missiles."

What's to be Gained — On the other hand, W. B. Bergen, president of The Martin Co., Baltimore, gives this reason why space exploration is necessary: "The most important things to be gained are the things we don't know."

To carry out space exploration, the government established the civilian space agency, NASA. Military and scientific efforts are separated, but not divorced.

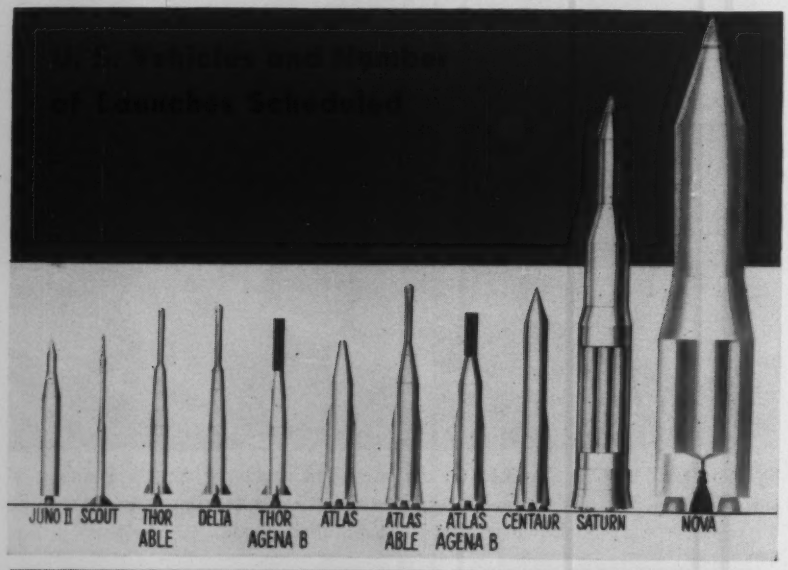
Established about 18 months ago, NASA has taken-on the task of putting the U. S. in space. Included in this are development of large booster-rockets, studying the universe—and putting man into space.

Ten-Year Plan—The space agency has mapped out a 10-year program for space exploration. Dr. T. K. Glennon, administrator of NASA, estimates the program will cost at least $12 billion to $15 billion over the period.

Man-in-space test flights will begin this summer. First flights for the Project Mercury manned satellite will last less than 15 minutes and carry man to a height of 120 miles. But they'll play an important part in determining how soon the U. S. will place a man in orbit.

But penetration of space will be made in a series of progressive steps. In the period from the last half of the present fiscal year through fiscal 1969, NASA expects to launch 260 major vehicles. (See table, p. 49.) In addition, hundreds of smaller, instrumental vehicles will be launched to gather scientific data.

NASA's Major Space Shots Plan



Fiscal Year	1960*	1961	'62	'63	'64	'65	'66	'67	'68	'69
Redstone	1	2 3 2								
Atlas	1	2 1 2 1	6	1						
Juno II	1	1 3								
Thor—Able	2									
Atlas—Able	1	1								
Scout	4	2 2	8	6	6	6	6	6	6	6
Thor—Delta	1 1	1 2 1 1	5							
Thor—Agena B			1	6	6	6	6	6	6	6
Atlas—Agena B		1	3	4	5	6	6	12	12	12
Atlas—Centaur		1	5	4	5	6	9			
Saturn			2	2	3	4	4	4	4	4
Nova Type									1	2
Total	12	29	28	23	25	28	28	28	29	30

* Last Two Quarters Only.

Saturn's Ring — Vehicles with larger, more powerful boosters are slated to come into use by the middle of fiscal 1961, boosting payload capabilities by several hundred pounds. By the following year, payloads will be up to 3000 lb.

Testing of the Saturn super-booster with a thrust of 1.5 million lb, compared with the present maximum of 350,000 lb, will begin in fiscal 1962. NASA's Dr. Glennan says the super-booster should be operational before the end of 1964. With this, the U. S. should be on a par with Russia.

Saturn will be able to lift from 20,000 lb to 30,000 lb into a close-in orbit around the earth. Or it could carry a 7000 lb package to the moon.

The Big Boost—An even more powerful booster, Nova, will come into use by the end of the decade. It will have a thrust of 6 million to 9 million lb. And it will consist of a cluster of F-1 engines, each capable of producing 1.5 million lb of thrust.

By the time Nova is operational, and very possibly before, nuclear powered rockets should also be available, according to Harold B. Finger, NASA's nuclear propulsion expert.

Nuclear engines, however, will still require the giant chemical boosters to get them off the ground and away from the earth's atmosphere. But they will enable travel through space for months at a time. Where chemical rockets obtain up to 400 lb of thrust per lb of propellant, Mr. Finger says the nuclear rockets will get up to 1000 lb thrust.

NASA's Mission—Beyond this is the electrical rocket, either ion propulsion or plasma. But this engine may be 15 or more years away, he says, and only time will tell if it's needed. The big problem will be in generating enough electricity—in the vicinity of one megawatt.

But there's more to space research than trips to outer space. And there are lots of questions to be answered before they are attempted, points out H. E. Newell, Jr., asst. director for advanced technology at NASA.

One of NASA's prime assignments, as set down by Congress, is: "The expansion of human knowledge and phenomena in the atmosphere and space."

Commercial Benefits—Studies of the sun-earth relationship will lead to improved communication systems, including world-wide television networks. They will aid in weather forecasting as well. Eventually, they may allow man to control the weather — eliminating dangers from flood, drought and blizzards.

Last week's 270-lb TV satellite will report on the earth's cloud cover, giving important data on how the earth's weather forms and moves.

Civilian space travel probably won't come until the next century. For one thing, more must be learned about the environment on other planets. For another, present costs are prohibitive.

Space-Age Switch—Martin's Mr. Bergen notes that the cost of present missile and space programs is so high that only the government can afford to support them. But Mr. Bergen and The Martin Co. are confident now that the space age has started, there is no turning back. A pioneer in the field of aircraft, the company is now almost entirely in the field of missiles and space vehicles.

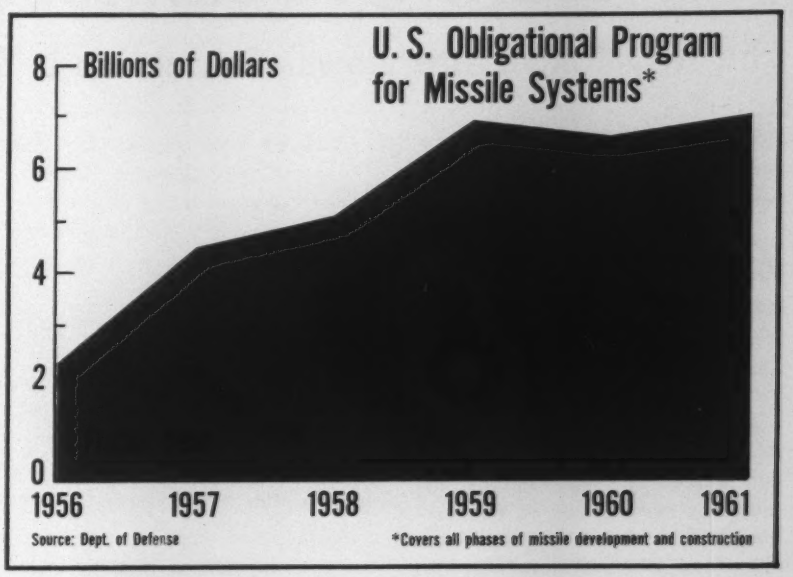
Other manufacturers apparently sense a declining role for aircraft in aerospace, also. Westinghouse Electric Corp. recently said it will go out of the jet engine business by the end of the year.

The reason? "Steadily declining requirements for jet engines and increasing emphasis on missiles and rockets" prompted the move, the company said.

A. G. Waggoner, special assistant to the director of Defense Research and Engineering for Guided Missile and Space Operations, says the department is making detailed studies of future needs: Does the U. S. want military bases in space?

The answer will likely be "yes." And Defense participation in space research and exploration would triple space spending, according to one source. Pentagon officials are already talking of the importance of bases on the moon as a deterrent force against aggressors.

Space Spending for Defense



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"No Glaring Weakness as I See It"

The IRON AGE Interviews—Republic's L. S. Hamaker

L. S. Hamaker is assistant vice president in charge of sales, Republic Steel Corp.

In this exclusive interview, Mr. Hamaker analyzes the steel market and the forces that affect it now and in the months ahead.

Q. Mr. Hamaker, as you no doubt are aware, the "bears" are out in strength predicting that the bottom is falling out of the steel market. How do you feel about this? Where do you feel is the strength and the weakness?

A. There is no glaring weakness as I see it. The gloom is deep because at the beginning of the year expectations were so fantastically high that even real good business now disappoints people.

We have lowered our estimate of steel production this year from a range of 130 to 135 million tons down to 122 to 125 million tons. This would still be an all time record which is hardly reason for gloom. Best previous is 117 million in 1955.

Q. How do you feel the steelmaking rate will run?

EXCEPTION TO THE RULE: Steel officials are not known for their willingness to go on the record in analyzing market conditions. An exception is Mr. Hamaker, who in this interview answers a series of questions covering the critical areas of the steel market.

A. Probably 93 pct of capacity in the first quarter, 85-87 pct in the second quarter, 75 pct in the third quarter and a slight upturn of 78 to 80 pct in the fourth quarter.

Q. The automotive industry is, of course, a prime factor in the steel market. How do you feel automotive will act?

A. Nothing has happened so far which would make a 6¼ million-car year impossible or unlikely. If we reach the end of April and sales are still disappointing, then we will have to lower our sights. The auto industry reaches a psychological "choke point" when dealer inventories rise to one million cars and that is what is happening now. But we must remember that the compacts actually make three new lines of cars this year. The high number of styles and options continues, too, so dealers must carry more cars.

Q. What precipitated the sudden let-down in new ordering?

A. Steel-consuming industries generally are shrinking their inventories. In 60 days or less, you will be able to get prompt delivery on anything. With 148 million tons capacity now, there will be no strain this year or for several years to come, except for brief periods.

In addition, we now have a labor contract to run for over two years. Customers, of course, know this and so are in no rush to order. The auto industry had only about 10 days inventory when the steel strike was finally settled. It understandably started placing heavy orders to stock up dealers for a good competitive position. Terrible weather this year has cut down on winter auto sales. You can't just turn off the pipe line, so parts and supplies keep coming in.

But there's lots of room for auto hopes this year. January sales were

6.3 pct over the same month last year. And February sales were up 19.5 pct over a year ago in spite of bad weather. Inventory in the hands of dealers is over one million cars, which is, of course, quite high. But it looks less when you consider the three new lines.

Our Gross National Product is nearing a record high of over $500 billion and Federal Reserve Board index was a record of 169 in January. February employment was a record high for the month. So manufacturing continued unabated through our steel strike and steel inventories are still uneven. They just won't be rebuilt as high as they were.

Q. What about steel prices?

A. After wage increases become effective in December, it is unlikely that steel prices will stand still. Smaller producers are already being pinched by the higher costs of the new contract. It doesn't yet go into pay envelopes but it is out-of-pocket expense to the mills.

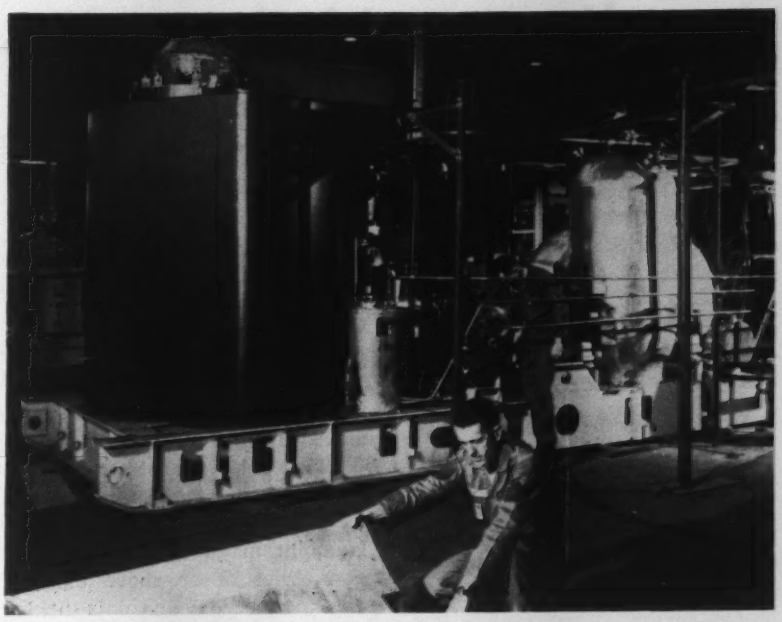
Q. Do you expect there will be price hedge buying late this year?

A. There is seldom as much price hedge buying as a lot of people think. Big tonnage users do relatively little of it. It is most commonly done by warehouses and other users. A lot of steel these days is custom-made. There are something like 1500 standard analyses. In bar mill flats, for instance, there are 55,000 possible size variations.

Q. What about imported steel?

A. As you know, last year was the first that import tonnage exceeded exports. The strike, of course, helped this along. The ratio a few years ago was 4 tons exported to 1 ton imported. We expect a ratio of two tons coming in for every ton going out will be the regular thing from here on, a fact of life.

For this year, imports will probably maintain last year's rate, especially when they again get their prices below the U. S. market. Quite a few customers using imports last year were sadly disillusioned by late deliveries and inflated prices.



NEXT STOP, GREENLAND: Engineers check out primary skid system for the PM-2A, first prefab nuclear power plant, now in pre-delivery tests.

Prefab Nuclear Plant Eases Fuel Problems

■ A skid-mounted nuclear power reactor, now under test, seems likely to solve fuel supply problems in remote Arctic locations.

The reactor, built to power an Army base on the Greenland ice-cap, is now getting pre-delivery testing at the manufacturer, ALCO Products, Inc., Dunkirk, N. Y. Known as PM-2A (for portable, medium power), it will be the first remote-area installation of atomic power in the Free World.

Fuel Needs Cut—Its use should simplify the transport of fuels for power generation at isolated sites. Normally at sites supported by air-lift, the delivered cost of diesel fuel can exceed $2.50 a gallon. Estimated annual fuel needs for a conventional power plant at the PM-2A installation would be 850,-000 gallons of oil, or more than 15,500 drums of 55-gallon size.

In contrast, Army and ALCO engineers estimate the PM-2A will operate for 12 months on a single loading of nuclear fuel. This can be shipped to Greenland in 11 steel drums with an equivalent 55-gallon capacity.

All on Ten Skids — The pressurized-water, prefabricated plant will be operating later this year in the snow tunnels at Camp Century, an advanced base of the Army's Polar Research and Development Center. It will deliver about 1560 net kilowatts plus about 1 million Btu's of steam for district heat. Output will be developed from a nuclear core burning enriched uranium.

The PM-2A plant is contained on 10 skids that hold all station generating equipment.

Appliance Makers Refute Gloom

Dealer-Distributor Sales Ahead of Factory Orders

In spite of pessimistic earlier reports, business is expected to match 1959.

Only dark spots are in ranges and home laundry equipment. —By K. W. Bennett.

■ How bad is the appliance business? For the record, here's what the manufacturers are saying:

"Business for the first quarter 1960 is at the high level achieved in first quarter last year. This is in line with our forecast of three months ago, when we revealed that 1959 was Frigidaire's second biggest sales year. (Only 1955 was better). We expect second quarter business to again match the 1959 period." The speaker is H. F. Lehman, General Motors vice president and general manager of Frigidaire Div.

Others Agree—From a General Electric spokesman: "General Electric distributor sales of major appliances are ahead of last year. We expect that this margin of improvement will increase in the second quarter. It is our belief that the entire appliance industry's sales moved up in the first quarter."

Whirlpool Corp. reports ranges have reached record shipment levels for the second consecutive month. Hotpoint, major GE subsidiary, reports sales at or above the like 1959 period. Maytag Co. is sticking to a forecast of a 5 pct increase for the industry in 1960.

Distributor Sales Up—One of the nation's largest distributing organizations reports retail sales in January were 6 pct ahead of a year ago. March sales are 8 pct over a year ago. A second national distributor says sales are up more than 5 pct. Sales by a major Midwestern distributor are running almost 10 pct ahead of the year-ago figure.

Are appliance builders whistling in the dark? Widespread reports of slow retail appliance sales hint at it. Unsold inventories of refrigerators hit 30 pct over year-ago levels at the end of January. Ranges approached the same figure. Top-heavy finished goods inventories caused the sharp declines in appliance production during 1954 and again in the 1957-58 period.

But manufacturers are sticking to forecasts for an overall gain in major appliance sales in 1960. Predicted increases range from as low as 3 pct to as high as 10 pct. The top of the forecast range comes mainly from laundry equipment manufacturers.

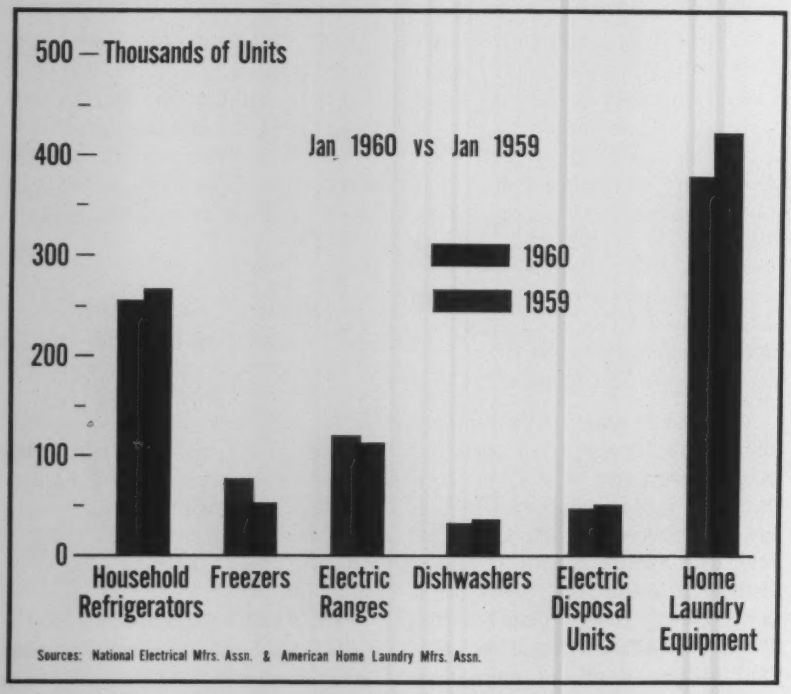
Inventory Build-Up—Big reason for manufacturers' optimism is their belief that dealers and distributors are selling at a rate greater than purchases from the factories. Sooner or later inventories need to be bolstered.

Early year dealer gloom, in the face of surprisingly good sales levels, is traced to three major sources:

Some distributors, and to a lesser extent dealers, boosted their major appliance inventories in November and December. This happened when the steel strike threatened to shut down many appliance plants, or at least curtail production. When appliance manufacturing bounced back with unexpected speed, they began to worry that they might be flooded with surplus inventory.

Bad Weather—A record spell of bad February-March weather made retail selling tough. Since it was nation-wide, everyone felt the pinch. The fact that it occurred in what normally is one of the slow-selling

How Appliance Sales Are Going



seasons of the appliance year was lost in the shuffle. Major dollar volume selling begins in June and carries through almost to December.

There appears to have been some unrealistically high forecasts for first and second quarter sales at the distributor-retail level.

Dark Spots Loom — There are dark spots. Ranges are expected to be hard to sell. One firm admits its total inventory is 50 pct over a year ago. Part of this, the firm points out, is equipment that begins to move to the distributor in March—air-conditioning and refrigeration equipment which won't do much in retail sales until June.

Another dark spot: Home laundry equipment factory sales have been below the year-ago month since last September.

But appliance makers see a silver lining to even these dark spots. Declining factory sales in late 1959 point to lower dealer-distributor inventories, they point out. And factory sales shot from 380,000 units this January, to 408,000 units in February. Laundry equipment makers see a 4 to 6 pct 1960 sales increase, at the moment.

How is the appliance business? The people who make them say it's pretty good.

Retail Sales Rise—Key to their hopes lies in retail sales. Two major producers report factory sales at year ago levels. But retail sales of their product, by the best barometers available, are 6 pct over last year, which would be a record figure.

At least three major distributors report the customers are buying 6-8 pct more than last year. One laundry equipment builder finds his dealers have sold 37 pct more units than they bought from factory in first quarter.

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BEFORE: Giant aluminum forging is worked between flat dies on the 8000-ton hydraulic forging press in initial step in forming mandrel.

Use Giant Forging For Wind Tunnel

■ Space programs, even for testing, demand the biggest.

These massive aluminum hand forgings, produced by the Cleveland works of Aluminum Co. of America, are destined for Douglas Aircraft Co.'s new hypersonic wind tunnel.

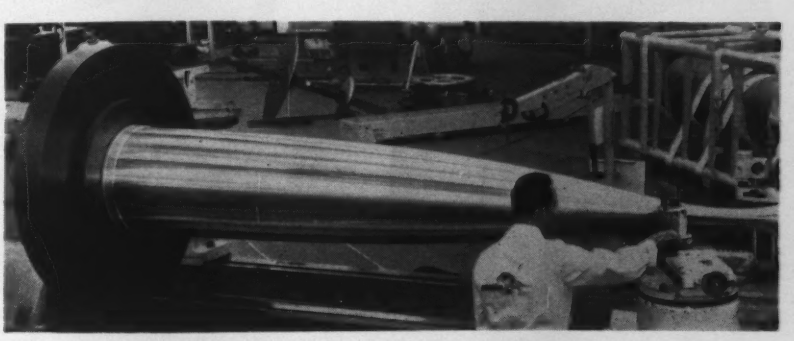
They are used as mandrels, or cores, in fabricating critical parts for industry's first major facility of this kind. They are forged from ingots weighing 8230, 9650, and 11,900 lb. They are used to form bottle-shaped nickel shells, used as high-strength, heat-resistant liners for nozzles in the testing chamber.

To simulate rocket - powered flight, Douglas will blast air through the trio of nozzles into the testing chamber at speeds from 4500 mph (Mach 6) to 7600 mph (Mach 10).

The giant forgings serve as a core, or mandrel, for a coating of nickel that ultimately becomes the largest nickel liner ever made.

The mandrel-liner assembly is exposed to sub-zero temperatures. Aluminum shrinks more than nickel at the same low temperature. As a result, the aluminum mandrel separates from the nickel coating.

This leaves the perfectly formed liner ready for installation in the wind tunnel nozzle. The aluminum mandrel can be reused to form more liners.



AFTER: Same forging is finish-machined by Douglas. It was machined to a part 12 ft long, with diameter tapering from 24 in. to 3 in.

Stainless Swings Into Full Color

Gilding the Lily? Mills Say Not, and Make it Stick

Colored stainless steel offers fabricators a new approach to bigger markets.

Architectural, restaurant and appliance fields look promising. Textures are available and cost is competitive.—By G. F. Sullivan.

■ Two steel companies last week handed stainless fabricators a new tool which should mean more business.

Until recently most color has been added to carbon steel. Results have been good but some major product areas remained closed. These include both exterior and interior jobs where corrosion resistance of the base metal and field-repairability are essential.

Why Gild the Lily?—When you talk about putting color on stainless the obvious question is "Why?" Stainless has a fine permanent finish; most people feel it's good-looking in itself.

Well, building is a big market. Aluminum and porcelain enamel have been getting the nod from architects.

Add Sales Appeal—The story was the same in the restaurant and dairy equipment field. Here stainless is often required by law—but the company that could offer bright colors would have an edge.

For some time, Armco Steel Corp. has been selling porcelain enamel on patterned stainless for architectural use. Last week, Washington Steel Corp. took the wraps off its Colorold system—offering 11 standard colors on its regular stainless sheet and strip.

Two Producers—Next day, Allegheny Ludlum Steel Corp. said it would soon offer stainless chromate-base coated in brown and black shades. "These have been thoroughly tested," said Allegheny's sales vice-president, W. B. Pierce. "As development work continues, the metal will be offered in a wide range of colors," he added.

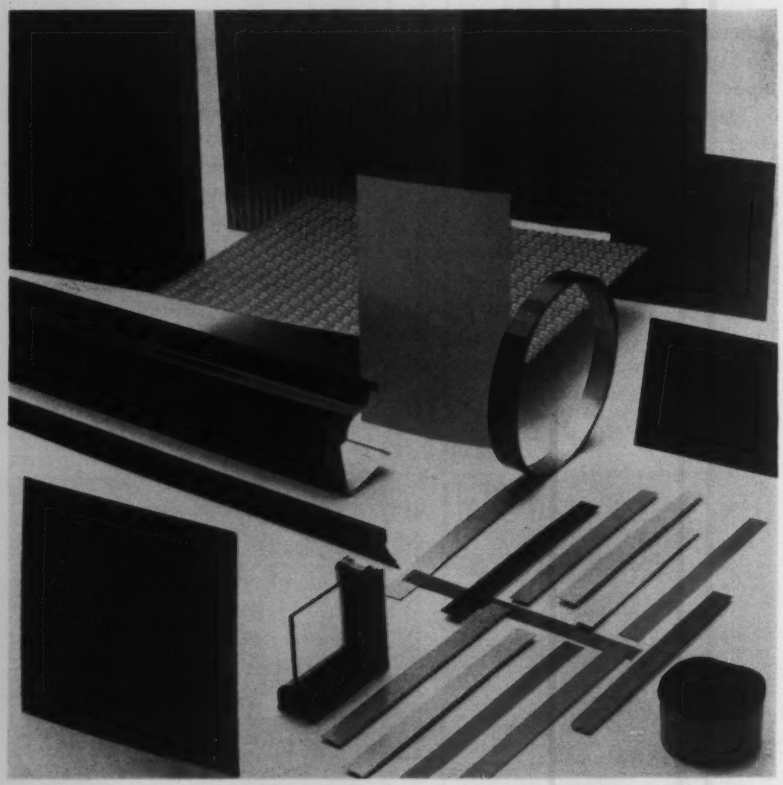
Spray on the Job—Washington Steel's Colorold uses a thermosetting acrylic coat which can be repaired on the job if scratched in shipment. It has been under test for 18 months in Florida, is now being applied to Gateway No. 4 building in Pittsburgh.

D. I. Brown, assistant to the president of Washington Steel, explains that coating life is related to the nobility of the base metal.

How About Cost? — Says Mr. Brown, who heads up the project, "We wouldn't be in this business if we weren't competitive now. Good architectural porcelain enamel (two-coat) runs between 90¢ and $1.03 per sq ft. Good architectural anodized aluminum (on alclad) is about the same. In a 5000-lb lot, our Colorold on 18-8 in 24-gage sells for 84¢ a square foot."

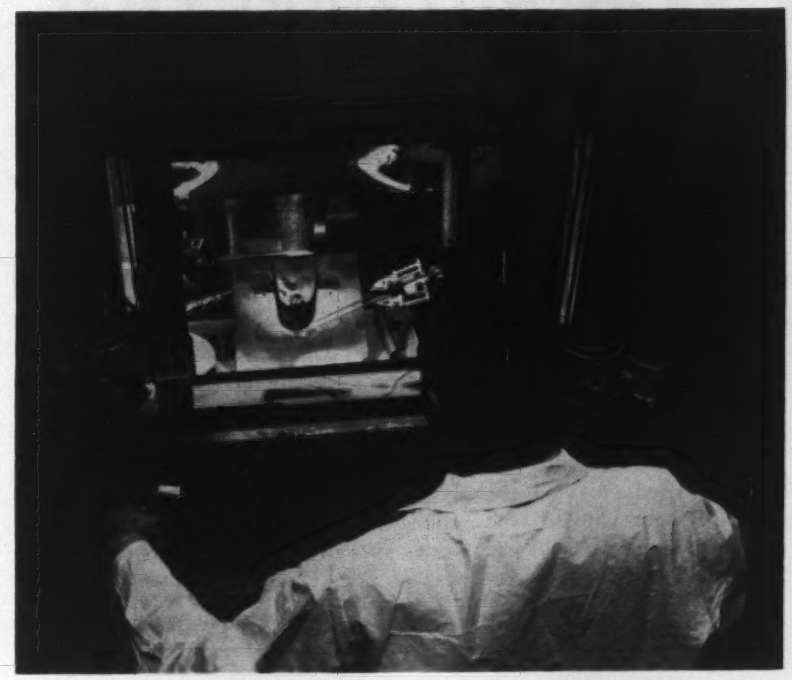
Appliances, kitchen, dairy and restaurant ware are other areas that should feel the impact of colored stainless — particularly in a patterned finish like those made by Rigidized Metals Corp.

R. S. Smith, president of Rigidized Metals, explains: "We not only provide an interesting pattern, but after the highlights are buffed, the color is protected."



COLORED STAINLESS: It can be roll-formed and deep drawn. Typical varieties show good potential. (Washington Steel Corp. photo).

Mechanical Hands Handle Cobalt



LIGHT TOUCH: A cobalt 60 pellet, held by remote control fingers, is encapsulated by a Budd Co. technician. He is looking through a three foot thick glass and oil window to protect him from radiation. Budd Co. uses 52 pct of all cobalt 60 isotopes shipped by AEC.

Sparrows Point To Be Enlarged

Bethlehem Steel Co., will increase the capacity of its Sparrows Point, Md., plant to nine million ingot tons during the next two years.

Capacity at the plant, the nation's largest steelmaking facility, is now 8.2 million tons.

No figures on the cost of the expansion have been released, but it is part of $197 million authorized for expansion and improvement programs.

Key to the increased ingot capacity is the plan to equip all furnaces in the new No. 4 openhearth shop for the use of oxygen.

New Warehouse

Ground has been broken for a new $1.25 million steel service center for A. M. Castle & Co., Bedford Heights, O., near Cleveland.

Another 25,000 sq ft building has been built at Galion, O.

The present warehouse in Cleveland will be disposed of when the new structure is completed in November.

Walter H. Anderson, former Baltimore district manager for Castle, has been named Cleveland manager. He succeeds Ernest W. Harwell

Wheeling Steel Eyes Price Rise

Another trial balloon on steel prices was launched last week by Wheeling Steel Corp.

John L. Neudoerfer, Wheeling chairman, says across-the-board increases are not being seriously considered. But, he says, "Some specific adjustments will eventually be necessary."

Full impact of increased labor costs resulting from the contract signed with the United Steelworkers last January will not be felt until next year, he says. But the possibility of absorbing the costs by increased production gains seems remote, Mr. Neudoerfer says.

Capacity Tripled

Installment of a new annealing and pickling line at the Youngstown plant of Jones & Laughlin Steel Corp. Stainless and Strip Div. has tripled stainless steel strip capacity.

The new line will be used mainly for annealing and pickling stainless strip for automotive and other applications.

Ore Imports Set Record

Imports of foreign ore set a new record in 1959. The American Iron and Steel Institute says.

The record 39.9 million net tons imported last year exceeded the old record of 37.7 million net tons set in 1957 by more than 5 pct. Total tonnage imported in 1958 was 31.2 million.

Top sources of iron ore imports include: Venezuela, 15.2 million tons; Canada, 15 million; Chile, 4 million; Peru, 2.5 million; Brazil, 1.3 million, and Liberia, 1.2 million tons.

Farm Incomes Down

Top government farm economists are predicting a 4.5 pct drop in net farm income this year. Farm income will be at an 18-year low.

For the farm machinery industry, it means farmers will be buying less than in the past.

A House agriculture subcommittee has been told the 1960 net income figure will be less than 1959 income. The latter is now estimated at $10.9 billion. And the 1959 total is nearly 16 pct below the 1958 figure.

Both the 1959 figure and 1960 estimates represent successive new lows for the period since 1942 when net farm income was $8.8 billion.

The forecast is likely to add new fuel to the political controversy over farm policy in Congress where a battle over farm legislation is brewing.

Steel: 1959 Was Puzzling Year

Despite Some Gains, Profit Squeeze Hurt

Both shipments and earnings improved for the major steelmakers last year.

But earnings didn't increase as much as sales and profit margins fell.—By G. J. McManus.

■ Steelmakers, after adding up the figures for 1959, are just beginning to realize how confused and amazing the year was.

With most of the industry strike-bound nearly four months, the mills still shipped more steel last year than in 1958. They collected more revenue. They earned more money.

Less Return on Sales—However, these gains lose some of their shine when it's remembered the previous year was one of the worst in post-war times. Also, the mills last year lost ground in two key areas. Return on sales dropped nearly 8 pct from 1958. Cash generated by depreciation fell 1.6 pct.

All in all, the year 1959 was not one to provide a clear picture of steel's financial future. Too many artificial forces were at work. However, the figures seem to indicate a growing profit squeeze and a shortage of capital dollars.

As the figures suggest (see IRON AGE financial analysis opposite), the big effect of the strike was to reduce profit margins rather than sales. Steel sales increased 12.4 pct from 1958 to 1959. Steel earnings increased only 3.4 pct. Had the mills been able to hold profit margins, earnings would have been nearly $70 million more.

How Strike Hurt—The drain of idle capacity was greatest for mills with the most capacity. Earnings decreased sharply last year for United States Steel Corp., Bethlehem Steel Corp., and Republic Steel Corp. Eight out of the next 10 mills by size showed higher earnings.

Kaiser Steel's vulnerability to a long strike shows up in profit figures. Among the original companies that formed the joint negotiating group, Kaiser was the only one to report a loss. With the second largest funded debt in the industry, the company piled up losses of $7.4 million for 1959.

Financial statements also back up Pittsburgh Steel's claim that its costs were out of line with the rest of the industry. The company was the only one in the industry to lose money in both 1958 and 1959. Despite higher sales, the 1959 loss was higher than the previous year's.

Shipments Strong—Possibly the most surprising thing about the year was the amount of steel shipped. Although the ingot rate rose only 4.5 pct, steel shipments jumped more than 15 pct. Heavy first half shipments, all-out operation by mills that were not on strike, and the quick general recovery after the strike combined for a shipping total close to 70 million tons.

This amount, along with imports of 4.4 million tons, just about equalled the steel consumed in 1959. Taking the year as a whole, there was practically no liquidation of inventory. This fact helps explain why steel demand eased so rapidly after the strike.

It also explains why steel forecasts are now being trimmed down. With the economy hitting record levels last year, the steel industry was able to shut down four months and operate at 60 pct while still meeting most needs.

Less Depreciation—Another item of concern is the decline in depreciation charges. For the industry as a whole these dropped in 1959 for the second straight year. Had depreciation remained at the level of 1957, profits would have been nearly $60 million less but the total cash flow $60 million more.

1959 Steel Earnings – The Top Twelve

Net income of 12 steel companies rated in order of reported 1959 profits, with pct of change from 1958.

COMPANY	1959	1958	PCT CHANGE
U. S. Steel Corp.	$254,563,401	$301,558,231	– 15.6
Bethlehem Steel Corp.	117,235,859	137,741,946	– 14.9
Armco Steel Corp.	77,064,249	57,512,151	+ 34.0
National Steel Corp.	54,897,360	35,827,414	+ 53.2
Republic Steel Corp.	53,890,116	61,921,680	– 13.0
Inland Steel Co.	48,354,030	47,869,042	+ 1.0
Youngstown Sheet & Tube	30,956,040	21,501,320	+ 44.0
Jones & Laughlin Steel Corp.	29,485,000	23,198,000	+ 27.1
Granite City Steel Co.	16,142,341	9,373,580	+ 72.2
Lone Star Steel Co.	14,175,678	1,064,697	+1231.0
Detroit Steel Corp.	11,939,492	1,153,692	+ 934.9
Allegheny Ludlum. Steel Corp.	11,290,664	5,844,803	+ 93.2

Common Stock	Surplus	Invested Capital	Working Capital	Net Income Percent of Investment[3]	Year	COMPANY
899,350,117	$1,924,096,165	$3,638,204,829	$615,538,386	7.4%	1959	U. S. Steel Corp.
897,135,367	1,856,569,230	3,601,550,892	696,296,429	8.6	1958	
554,572,345	994,353,908	1,791,793,953	725,133,178	6.8	1959	Bethlehem Steel Corp.
540,734,955	992,497,965	1,786,505,120	700,321,744	8.1	1958	
157,035,361	564,964,658	816,885,556	235,174,285	7.1	1959	Republic Steel Corp.
156,462,211	556,853,360	811,474,121	245,895,793	8.0	1958	
77,832,000	417,532,000	673,966,000	167,311,000	5.2	1959	Jones & Laughlin Steel Corp.
77,482,000	408,254,000	658,380,000	153,120,000	4.2	1958	
75,386,430	415,588,995	682,182,129[5]	241,597,605	8.8	1959	National Steel Corp.
74,662,810	380,277,235	566,889,286[5]	137,287,541	7.0	1958	
112,586,010	343,576,513	571,273,041	200,883,165	6.2	1959	Youngstown Sheet & Tube Co.
111,173,885	329,976,887	554,330,772	228,458,361	4.5	1958	
117,170,361	345,100,106	677,698,167	157,187,795	8.80[7]	1959	Inland Steel Co.
109,945,512	323,445,618	604,801,130	145,933,487	9.10[7]	1958	
147,955,157	522,533,000	845,087,157	387,334,798	9.8	1959	Armco Steel Corp.
147,835,367	489,580,922	744,472,289	340,971,865	8.2	1958	
3,279,123	92,050,613	384,438,427	22,865,709	1.2	1959	Kaiser Steel Corp.
3,264,462	103,682,885	407,970,265	37,985,905	4.3	1958	
18,617,161	122,420,901	227,322,687	89,499,216	3.58	1959	The Colorado Fuel & Iron Corp.
17,178,093	119,864,788	195,728,675	69,041,476	2.58	1958	
20,955,280	152,196,561	238,567,941	86,055,023	3.48	1959	Wheeling Steel Corp.
19,366,770	144,283,105	237,440,675	85,890,156	4.31	1958	
4,307,192	76,712,915	159,983,907	41,305,189	7.57	1959	McLouth Steel Corp.
3,722,825	57,550,505	162,564,480	43,924,343	7.40	1958	
11,106,880	68,131,208	90,803,088	38,802,242	2.87	1959	Sharon Steel Corp.
11,085,400	66,679,042	90,264,442	37,300,295	0.85	1958	
15,865,950	46,667,499	116,331,119	28,355,423	.49	1959	Pittsburgh Steel Co.
15,858,900	48,966,001	120,019,201	30,868,954	.62	1958	
26,718,262	70,104,056	134,311,599	37,051,123	13.3	1959	Granite City Steel Co.
26,619,950	58,352,822	123,871,072	33,448,593	9.1	1958	
48,320,388	74,687,579	153,585,467	61,604,040	4.52	1959	Crucible Steel Co.
47,419,825	71,243,354	142,135,179	60,453,152	3.67	1958	of America
3,179,760	43,331,902	73,028,757	24,609,403	4.7	1959	Lukens Steel Co.
3,179,760	40,096,987	63,776,747	19,503,669	6.6	1958	
3,030,068	61,774,546	86,304,614	34,664,865	15.24	1959	Detroit Steel Corp.
3,012,423	53,110,795	81,723,218	27,402,213	2.98	1958	
3,869,654	105,303,887	153,210,141	77,698,897	8.38	1959	Allegheny Ludlum Steel Corp.
3,856,008	101,412,362	141,392,570	62,706,425	5.15	1958	
4,354,736	20,250,714	32,929,710	21,287,396	8.18	1959	Phoenix Steel Corp.
4,148,964	18,491,995	32,168,100	18,536,852	4.07	1958	
12,510,565	25,647,435	44,158,000	15,571,995	19.9	1959	Northwestern Steel & Wire Corp.[16]
12,510,565	19,449,016	39,205,142	10,335,021	14.0	1958	
6,960,070	25,529,855	37,329,725	7,004,206	13.01	1959	Alan Wood Steel Co.
6,960,070	21,890,370	38,227,292	7,082,772	5.52	1958	
3,567,080	61,116,971	102,069,033	46,555,927	16.33	1959	Lone Star Steel Co.
3,206,300	46,517,315	100,793,359	39,258,423	3.76	1958	
5,877,235	41,819,960	66,327,363	30,249,255	9.84	1959	Copperweld Steel Co.
5,509,445	36,765,495	56,065,725	21,644,387	4.74	1958	
4,125,000	28,195,405	35,920,405	17,207,983	16.19	1959	Laclede Steel Co.
4,125,000	24,212,753	32,137,753	16,676,214	12.10	1958	
2,604,167	43,851,737	46,455,904	3,510,471	19.18	1959	Keystone Steel & Wire Co.
2,604,167	38,690,355	41,294,522	2,875,381	16.31	1958	
7,229,614	18,269,983	30,703,300	16,572,936	18.7	1959	Continental Steel Corp.[17]
7,229,614	18,269,983	27,570,052	13,638,973	14.4	1958	
2,000,000	7,802,383	13,957,828	5,974,629	9.7	1959	Atlantic Steel Co.
2,000,000	6,736,754	12,892,199	4,735,409	2.7	1958	
350,365,966	$6,713,611,455	$11,924,289,846	$3,436,606,140	6.6	1959	GRAND TOTAL
318,290,648	$6,398,900,899	$11,475,644,278	$3,291,595,833	6.6	1958	
+1.4	+4.9	+3.9	+4.4	0.0		Percent Change 1959 over 1958

16. Adjusted for 10 pct stock div.
17. Capital in excess of par $270,455.

STEEL INDUSTRY FINANCIAL ANALYSIS

DATA COVER OPERATIONS OF 28 COMPANIES REPRESENTING 93 PCT OF THE INGOT CAPACITY OF THE UNITED ST

COMPANY	Year	Ingot Capacity Net Tons	Ingot Production Net Tons	Percent of Capacity Operated	Steel Shipments Net Tons	Net Sales and Operating Revenue	Depreciation, Depletion and Amortization	Provi for Fe Inco Tax
U. S. Steel Corp.	1959	41,916,000	24,445,353	58.3 %	18,093,747	$3,643,040,035	$189,854,452	$233,00
	1958	40,212,000	23,818,889	59.2	16,992,305	3,472,177,091	204,899,055	285,00
Bethlehem Steel Corp.	1959	23,000,000	14,257,356	62.0	10,267,778	2,079,082,467	97,541,623	123,00
	1958	23,000,000	13,393,034	58.2	9,686,228	2,024,282,732	108,655,366	131,00
Republic Steel Corp.	1959	12,742,000	7,504,624	58.9	5,446,342	1,076,832,407	34,666,022	52,80
	1958	12,242,000	6,430,283	52.5	4,463,595	910,382,817	33,074,198	60,50
Jones & Laughlin Steel Corp.	1959	8,000,000	4,896,000	61	3,869,000	765,672,000	48,005,000	27,59
	1958	7,500,000	4,947,000	66	3,357,000	654,060,000	48,038,000	18,09
National Steel Corp.	1959	7,000,000	5,331,496	76	4,433,957	736,978,650	36,487,856	58,25
	1958	6,800,000	4,476,238	66	3,248,706	539,957,294	39,350,724	35,00
Youngstown Sheet & Tube Co.	1959	6,750,000	4,100,717	60.8	3,008,183	617,889,289	25,505,695	30,60
	1958	6,500,000	3,659,482	56.3	2,542,714	506,959,574	29,662,816	20,17
Inland Steel Co.	1959	6,500,000	4,227,317	65.0	3,162,272	713,215,002	35,208,330	39,15
	1958	5,800,000	4,714,904	81.3	3,384,209	661,253,596	29,752,455	42,44
Armco Steel Corp.	1959	6,400,000	5,128,907	80.1	4,103,543	1,022,428,742	36,937,862	75,86
	1958	6,394,200	4,506,127	70.5	3,640,620	867,390,909	34,456,960	55,86
Kaiser Steel Corp.	1959	2,933,000	1,537,802	52.4	1,056,727	202,126,940	28,795,515	7
	1958	1,536,000	1,466,278	95.5	940,500	181,385,288	17,825,807	2,17
The Colorado Fuel & Iron Corp.	1959	2,836,500	1,682,541	59.32	1,341,549	280,288,103	12,723,538	3,72
	1958	2,836,500	1,706,308	60.16	1,355,084	276,163,902	13,176,766	2,46
Wheeling Steel Corp.	1959	2,400,000	1,397,002	58.2	1,139,036	211,633,718	14,674,809	4,20
	1958	2,400,000	1,580,214	65.8	1,199,363	221,009,355	14,697,131	6,95
McLouth Steel Corp.	1959	2,040,000	1,215,693	59.59	966,967	177,446,839	14,105,539	5,60
	1958	1,574,000	1,396,103	88.70	1,047,029	171,590,704	13,588,974	2,43
Sharon Steel Corp.	1959	1,861,000	973,844	52.3	647,460	119,760,979	3,791,389	1,78
	1958	1,989,000	779,281	39.8	517,277	99,970,977	3,678,381	*19*
Pittsburgh Steel Co.	1959	1,560,000	935,411	60.0	794,061	150,647,405	8,074,608	57
	1958	1,416,000	955,593	61.3	725,653	134,475,314	7,705,900	*1,41*
Granite City Steel Co.	1959	1,440,000	1,307,970	90.8	1,126,328	164,371,219	6,556,861	17,23
	1958	1,200,000	1,106,556	92.2	879,500	125,272,603	4,953,639	10,12
Crucible Steel Co. of America	1959	1,431,180	886,726	62.0	579,488	219,229,082	9,222,824	4,90
	1958	1,424,530	710,823	49.9	457,741	186,363,233	9,248,738	2,31
Lukens Steel Co.	1959	930,000	568,244	61.1	377,624	83,178,393	3,377,804	2,52
	1958	750,000	602,996	80.4	404,770	99,256,110	2,114,126	4,25
Detroit Steel Corp.	1959	900,000[11]	824,757	92	719,811	117,047,867	4,463,202	11,91
	1958	1,500,000	447,613	30	386,093	61,781,666	4,726,999	1,25
Allegheny Ludlum Steel Corp.	1959	864,200	460,785	53.3	296,126	232,559,479	8,551,837	11,96
	1958	864,200	418,254	48.4	259,855	202,572,808	9,628,709	6,17
Phoenix Steel Corp.	1959	846,760	556,031	65.67	.....	60,615,789	1,684,545	2,47
	1958	846,760	226,110	26.70	.....	27,614,634	2,208,478	*2,18*
Northwestern Steel & Wire Corp.[14]	1959	825,000	638,203	77.4	538,009	83,781,108	2,321,004	9,20
	1958	825,000	473,561	57.4	380,518	60,468,595	2,241,295	5,84
Alan Wood Steel Co.	1959	800,000	740,254	92.53	517,985	81,074,208	4,497,535	4,11
	1958	800,000	505,341	63.17	335,571	54,163,265	3,822,587	99
Lone Star Steel Co.	1959	800,000	751,477	93.93	.....	112,944,477	4,959,423	14,59
	1958	800,000	384,475	48.06	.....	45,804,182	4,693,713	60
Copperweld Steel Company	1959	660,000	.....	.....	.....	138,364,827	3,032,350	6,33
	1958	660,000	.....	.....	.....	93,526,153	2,934,751	2,17
Laclede Steel Co.	1959	600,000	600,384	100.06	482,867	87,671,707	1,467,012	6,40
	1958	600,000	454,693	75.7	350,324	63,159,247	1,497,801	4,07
Keystone Steel & Wire Company	1959	600,000	502,271	83.71	400,137	82,838,545	1,654,005	9,25
	1958	450,000	366,793	81.51	291,734	61,198,258	1,170,204	6,99
Continental Steel Corp.[17]	1959	420,000	388,365	92.5	311,340	57,083,835	1,388,381	6,27
	1958	420,000	308,248	73.4	253,835	46,798,182	1,353,381	4,40
Atlantic Steel Co.	1959	276,000	217,744	78.89	170,288	29,433,860	739,108	1,63
	1958	276,000	146,643	53.13	129,046	22,083,434	658,207	24
GRAND TOTAL	1959	137,231,640	87,000,000[1]	63.3[2]	64,500,000[1]	$13,347,236,972	$ 639,287,929	$765,03
	1958	131,616,000	79,000,000[1]	60.6[2]	56,000,000[1]	$11,871,121,923	$ 649,815,161	$707,73
Percent Change 1959 over 1958		+4.2	+10.1	+4.5	+15.2	+12.4	−1.6	+8

1. Estimate based on national operating rate.
2. National rate for industry by AISI.
3. Italics indicate loss.
4. Italics indicate tax credit.
5. Less Treasury stock.
6. Adjusted for 3-1 split May 15, 1959.
7. Average of Jan. 1 and Dec. 31 invested capital.
8. Includes $1,825,000 special credit relating to prior years.
9. Includes 200,000 shares 5½ ence stock, par value $100 of $1,150,000 in 1959 and $

STATES AS OF JANUARY 1, 1959

ovision Federal ncome Taxes[4]	Net Income[3]	Net Income Percent of Sales[3]	Number of Common Shares Outstanding	Earnings Per Common Share[3]	Common Dividends Declared	Number of Preferred Shares Outstanding	Preferred Dividends Declared	Funded Debt	Preferred Stock	
,000,000	$254,563,401	7.0%	53,961,007	$4.25	$161,816,789	3,602,811	$25,219,677	$454,447,447	$360,281,100	$
,000,000	301,558,231	8.7	53,828,122	5.13	161,413,701	3,602,811	25,219,677	487,565,195	360,281,100	
000,000	117,235,859	5.6	45,455,208	2.44	108,842,707	933,887	6,537,209	149,479,000	93,388,700	
000,000	137,741,946	6.8	45,087,548	2.91	107,516,143	933,887	6,537,209	159,883,500	93,388,700	
800,000	53,890,116	5.0	15,693,074	3.43	47,017,535	.....	.....	94,885,537	.....	
500,000	61,921,680	6.8	15,635,759	3.96	46,857,976	.....	.....	98,158,550	.....	
594,000	29,485,000	3.9	7,834,092	3.58	19,543,000	293,568	1,468,000	149,245,000	29,357,000	
090,000	23,198,000	3.6	7,796,354	2.79	19,477,000	293,568	1,468,000	143,287,000	29,357,000	
250,000	54,897,360	7.45	7,538,643	7.28	22,522,643	.....	.....	191,308,555	.....	
000,000	35,827,414	6.64	7,466,281	4.80	22,298,906	.....	.....	112,076,555	.....	
600,000	30,956,040	5.1	3,477,905	8.90	17,356,414	.....	.....	115,110,518	.....	
170,000	21,501,320	4.3	3,452,598	6.23	17,245,921	.....	.....	113,180,000	.....	
150,000	48,354,030	6.4	17,444,272	2.77	26,699,542	None	None	215,427,700	None	
440,000	47,869,042	7.3	17,267,763[6]	2.77	25,807,987	None	None	171,410,000	None	
862,114	77,064,249	7.5	14,795,516	5.21	44,377,417	.....	.....	174,599,000	.....	
860,180	57,512,151	6.6	14,783,537	3.89	44,203,330	.....	.....	107,056,000	.....	
70,000	*7,401,076*	*3.7*	3,279,123	*3.26*	1,307,057	1,661,263[9]	3,300,113[9]	232,577,116	56,531,575[9]	
175,000	5,422,271[8]	3.0	3,264,462	.76	1,299,800	1,683,585[9]	2,941,900[9]	243,933,293	57,089,625[9]	
723,600	4,364,554	1.56	3,739,967	1.04	Stock—8%	159,219	463,661	78,318,700	7,965,925	
468,500	2,147,223	.78	3,452,153	.47	Stock—2%	179,539	525,650	49,708,000	8,977,794	
209,000	7,033,050	3.32	2,095,528	2.53	4,976,908	342,975	1,724,416	31,118,600	34,297,500	
954,000	8,899,267	4.03	1,936,677	3.69	3,873,324	347,580	1,751,878	39,032,800	34,758,000	
600,000	10,058,232	5.67	1,722,877	5.32	None	306,865	899,362	67,420,000	11,543,800	
430,000	9,998,374	5.83	1,489,130	5.65	None	481,810	1,590,197	75,546,000	25,745,150	
787,000	2,145,593	1.79	1,104,649	1.94	1,104,069	None	None	10,400,000	None	
190,000	224,942	0.22	1,102,501	0.20	880,515	None	None	11,800,000	None	
579,000[10]	*994,310*	*.66*	1,586,595	*1.45*	None	241,943	1,308,148	29,603,370	24,194,300	
418,000[10]	*865,593*	*.65*	1,585,890	*1.37*	None	241,943	1,308,148	31,000,000	24,194,300	
230,000	16,142,341	9.8	2,137,461	7.53	4,483,180	7,307	52,242	36,758,581	730,700	
127,000	9,373,580	7.5	2,129,549	4.36	3,405,083	16,073	93,331	37,291,000	1,607,300	
900,000	6,106,443	2.8	3,865,631	1.50	3,078,505	99,885	293,851	20,589,000	9,988,500	
315,000	4,274,793	2.3	3,793,586	1.13	1,896,163	.....	.....	23,472,000	.....	
520,000	2,598,496	3.1	953,928	2.72	953,928	None	None	26,517,095	None	
255,000	4,181,986	4.2	953,928	4.38	1,907,856	None	None	20,500,000	None	
910,000	11,939,492	10.2	3,030,068	3.90	3,408,826	15,000	90,000	20,000,000	1,500,000	
250,000	1,153,692	1.9	3,012,423	0.31	1,506,211	36,000	216,000	22,000,000	3,600,000	
960,000	11,290,664	4.85[12]	3,869,654	2.92	7,729,553	.....	.....	44,036,600	.....	
174,000	5,844,803	2.89[12]	3,856,008	1.52	7,707,707	.....	.....	36,124,200	.....	
475,000	2,108,754	3.48	1,036,877[13]	2.03	5% Stock	None	None	8,324,260	None	
185,396	*1,966,545*	*7.12*	1,037,241	*1.90*	None	None	None	9,527,141	None	
200,000	8,450,321	10.1	2,502,113	3.38	2,251,903	None	None	6,000,000	None	
840,000	5,049,890	8.4	2,502,113	2.02	1,251,056	None	None	7,245,561	None	
118,000	4,855,885	5.99	696,007	6.63	974,410	48,398	241,990	.....	4,839,800	
997,000	2,109,203	3.89	696,007	2.68	487,205	48,398	241,990	4,537,052	4,839,800	
598,000[15]	14,175,678	12.55	3,567,080[16]	3.97	10% Stock	None	None	37,000,000	None	
600,000[15]	1,064,697	2.32	3,526,930[16]	.30	10% Stock	None	None	50,176,099	None	
836,000	5,972,457	4.3	1,175,447	5.00	2,258,121	None	91,005	18,630,168	None	
175,000	2,081,114	2.2	1,101,889	1.76	1,092,835	45,306	138,356	11,525,485	2,265,300	
400,000	5,632,652	6.42	206,250	27.31	1,650,000	None	None	3,600,000	None	
975,000	3,704,251	5.86	206,250	17.96	1,650,000	None	None	3,800,000	None	
256,741	8,911,383	10.76	1,875,000	4.75	3,750,000	None	None	None	None	
992,003	6,736,519	11.01	1,875,000	3.59	3,750,000	None	None	None	None	
275,000	5,657,052	9.91	516,401	10.95	2,323,804	None	None	1,600,000	None	
400,000	3,887,634	8.31	516,401	7.53	1,807,403	None	None	1,800,000	None	
635,000	1,349,526	4.6	396,500	3.29	237,900	6,571	7.00	4,050,000	700,000	
241,000	353,235	1.6	396,500	0.77	.....	6,571	7.00	4,750,000	700,000	
938,455	$786,843,242	5.9	205,556,873	$3.83	$488,664,211	7,719,692	$41,736,671	$2,221,046,247	$635,318,900	$2,
735,287	$760,805,120	6.4	203,752,600	$3.73	$477,336,122	7,917,071	$42,089,387	$2,076,385,431	$646,804,069	$2,
+8.1	+3.4	−7.8	+0.9	+2.7	+2.4	−2.5	−0.8	+7.0	−1.8	

5¼% convertible preferred
00 a share with dividends
d $720,000 in 1958.

10. $692,000 provided for future tax in 1958. In 1959 a credit of $973,000 provided for future taxes.
11. Active capacity Jan. 1, 1959.
12. Without giving effect to income taxes on bond interest and expense.
13. 51,807 shares issuable re 5% stock div.
14. Data based on fiscal years ending July 31.
15. Includes future tax provision.

Truman H. Kennedy

An Old Hand at Blast Furnaces

T. H. Kennedy, operations vice president, National Tube Div., U. S. Steel, is an experienced steelmaker.

An amiable person, he helped establish good management-labor policies for the company.

■ At the height of the excitement over higher iron yields from blast furnaces, National Tube Div. of U. S. Steel has brought an expert in the field into Pittsburgh headquarters. Blast furnace yield from beneficiated ore is one of the hottest subjects today among steel mill operating men. And Truman H. (Pat) Kennedy, new operations vice president, is an old hand at blast furnaces.

Until February of this year he was general superintendent of National Tube's Lorain (Ohio) Works, largest steel pipe mill in the world. There he won the admiration even of the bitterly pro-labor local newspaper which gave him a complimentary send-off.

TRUMAN H. KENNEDY: He fostered a world safety record.

World Record—And at a dinner for 1600 honoring Lorain Works' new world safety record, he got a standing ovation from the mill men. And in addition, the men set a new blast furnace production record in January, last month of his term at Lorain. Now he is in charge of operations of five National Tube mills employing over 20,000 people.

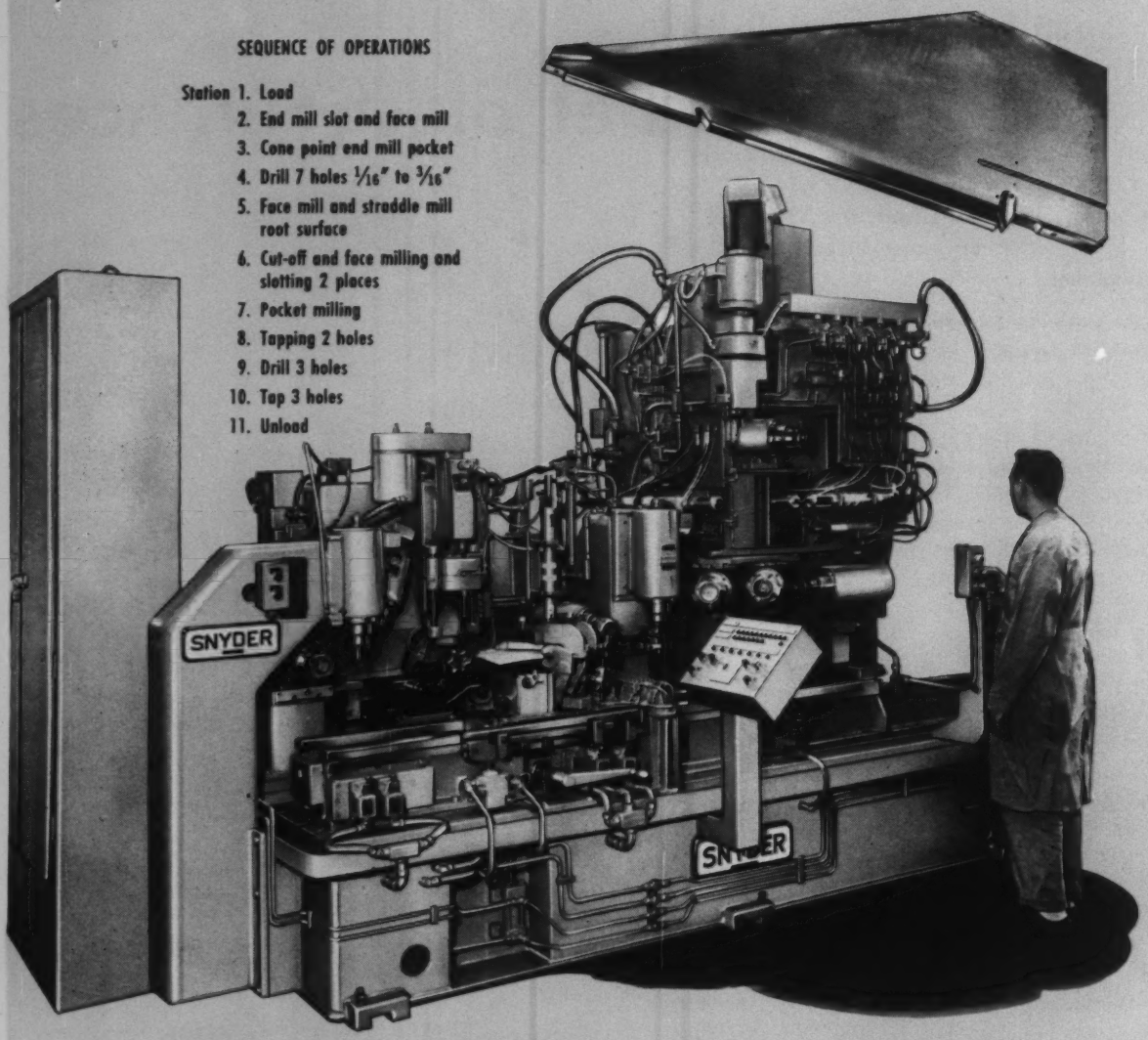
Mr. Kennedy has come a long way from his birthplace in the remote hills of Big Stone Gap, Va. He started in the steel business as a chemist at one of the small iron furnaces that dotted the mountain country there. This one worked 30-40 pct ore plus coal and limestone, all mined close by. It was rated about 300 tons per day, done in four or five casts. The furnace work gave him a taste for the steel business. He succeeded in getting to the Missouri School of Mines and Metallurgy, graduating with a B. S. in metallurgy in 1926.

The Experience—He then took a succession of jobs working at blast furnaces of such firms as Pittsburgh, Crucible, Interlake Iron and Inland Steel. The experience of those days has been invaluable.

He holds a number of patents on blast furnace stoves, and improvements to bells and charging mechanisms. In 1940 he started with National Tube as blast furnace superintendent at National's Works at McKeesport, Pa., through the war years. Six years later he was made assistant general superintendent and two years later, in 1948, was made general superintendent. He stayed at this nine years until being named to the same job at the larger Lorain Works.

Satisfaction — His biggest satisfaction there came from a high safety record set by the steelmen of Lorain. In February it reached over 10 million man-hours production without a lost time accident. It was reached during full scale production before and after the strike.

He rightly attributes the record to teamwork among the workers, supervisors and inspectors.


SEQUENCE OF OPERATIONS
Station 1. Load
2. End mill slot and face mill
3. Cone point end mill pocket
4. Drill 7 holes 1/16" to 3/16"
5. Face mill and straddle mill root surface
6. Cut-off and face milling and slotting 2 places
7. Pocket milling
8. Tapping 2 holes
9. Drill 3 holes
10. Tap 3 holes
11. Unload
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at Martin Company's Baltimore Division

Production rate, tolerances and part configuration dictated the fundamental design concept of this exceptionally compact tool which has 11 stations and performs 24 operations.

The cycle can be automatic, semi-automatic or manual. Controls for multiple cycle operations are provided by utilizing basic circuits triggered by a programming control device.

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Consumers Still Want to Buy

Most buyers are convinced that good times will prevail in the next 12 months, U. of M. survey shows.

Interest in purchasing durables, which slowed down in last year's strike period, has revived.

■ There are various ways to predict consumer buying trends. You can chart personal income, translating an increase into a future demand for goods. Or you can watch the level of consumer credit, estimating whether it encourages or retards spending. The rise and fall in employment gives clues on consumer attitudes.

But all these economic barometers won't tell you one important fact—how the consumer feels about buying. That's where the University of Michigan's continuing survey of consumer finances comes in. It probes into buyer attitudes on economic conditions and feelings about purchasing.

Good News — You'll find much that's encouraging in the latest 3000-family survey taken January and February. Among the findings: Consumers are showing more confidence about the economy. They have a greater desire to buy, thus continuing a trend interrupted by the steel strike.

These buying inclinations "promise a positive stimulus to the American economy, without confirming some economic predictions of a great 1960 boom in consumer spending," the survey notes.

More Car Buyers — Greatest change in sentiment concerns the buyers' opinion on the business outlook and market conditions. Three out of four Americans believe good times will prevail in the next 12 months.

Compared with a year ago, more people think "it's a good time to buy" automobiles and other durable goods. Intentions to buy a new car are 20 pct above year-ago levels. Reception of the compact cars has been favorable. But for Detroit automakers this is a mixed blessing. Says the survey: "Since a substantial proportion of prospective car buyers intend to purchase compact cars, the median planned expenditure for new cars shows a sizable drop as against last year."

Hypo for Housing—Other spending plans are showing an upswing. Intentions to buy homes recovered in the last few months, after declining when interest rates increased last year. Purchase plans for most household equipment items are "somewhat higher," the survey indicates.

But there is one large stumbling-block as far as the consumer is concerned—inflation. Almost three-fourths of those questioned expect prices to rise over the next 12 months. And most consumers regard the prospect of inflation as unfavorable to the economy or their personal financial position.

Even in their long-range thinking, buyers are pessimistic about the chance of halting inflation. When asked what prices will do during the next five years, almost half expected price increases.

Managers or Psychologists?

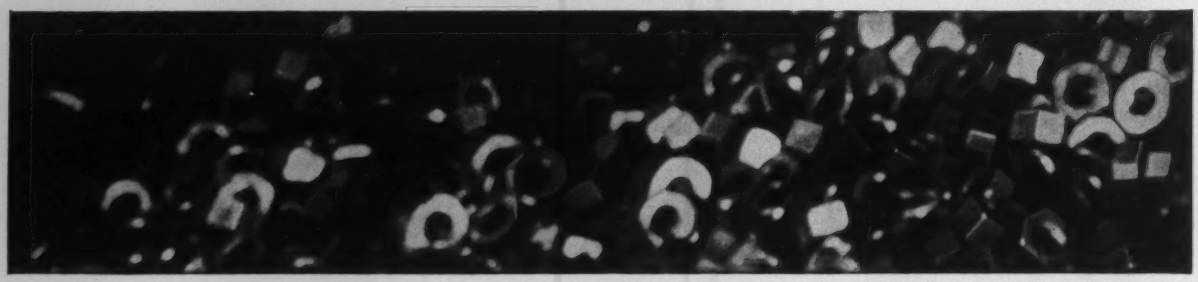
■ In the future, managers may spend as much time working with the industrial psychologist and the sociologist as they now do with the engineer and the accountant.

That's the conviction of Forrest H. Kirkpatrick, assistant to the president, Wheeling Steel Corp. He reasons management men are becoming concerned with applications of psychology and other behavioral sciences. Some of this comes from depersonalized relationships in the mill or factory, the greater distance between people, and the increase in automation.

Call for Study—"These are problems management can't sweep under the rug," says Mr. Kirkpatrick, "And they call for more than superficial treatment or pious comments. "Such loosely used terms as morale, job satisfaction, motivation, and work behavior must be studied in specific terms. Then these elements must be related to productivity and labor peace. Because valid information in these areas is very limited, there must be more and more research in the behavioral sciences and their application to industrial problems."

Change in Thinking—He adds, "What we hope to achieve in the way of industrial harmony and efficiency must come largely from the behavioral sciences and here is where industry does not have the professional help needed."

Change in nut saves $11,000



RB&W survey shows business machine maker how simple change in fastener dimensions will add to profits the equivalent of $110,000 in extra sales

A simple change in nut size offered one typewriter manufacturer an $11,000 a year saving. Yet it involved no re-engineering . . . no compromise with quality.

The RB&W Fastener Man was invited to make a survey of the manufacturer's fastener usage. In studies of blueprints and specifications, he found only one minor area for improvement–but what an improvement! The drawings still showed a hex nut taken from specifications long obsolete as a standard. By simply switching to the current standard size, the manufacturer could save $11,000. That's pure profit. Even if his net-on-sales were as high as 10 per cent. It would take *extra* typewriter sales of $110,000 to net the same amount.

Are you sure you're not wasting needless dollars on fastener specifications? Why not ask for an RB&W man to make a survey of your fastening operations. He's no smarter than your engineers, but he knows what to look for. Write Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, New York.

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115th year

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Will Cryogenics Aid Automakers?

Ford Researchers Say It Will Lead to Many New Developments

Ford is looking forward to countless developments in better car making through cryogenics.

However, practical application on cars is still many years away.—By A. E. Fleming.

■ Does cryogenics — the study of how materials act near absolute zero temperatures—have a place in the auto industry?

"Definitely yes," according to Dr. J. E. Goldman, manager of Ford Motor Co.'s Scientific Laboratory physics department. "Although the science is young, cryogenic tests we're conducting should some day uncover information valuable to car makers. Practical applications on cars as a result of our tests may be as much as 50 years away, however."

Motionless Molecules—Most of the work in Ford's cryogenics lab centers on the physics of metals, studying them while they're so cold that molecular motion stops and metals take on different, often peculiar, characteristics.

What might such studies lead to in the next several decades? Better automotive materials of all kinds —stronger, more workable steels, aluminums and plastics, for example. They might even lead to the development of brand new materials. Or cryogenic studies may help scientists find a way to control the sun's rays, using them as heating or cooling units in a car. And discoveries through cryogenics of new fuels and energy sources are not improbable.

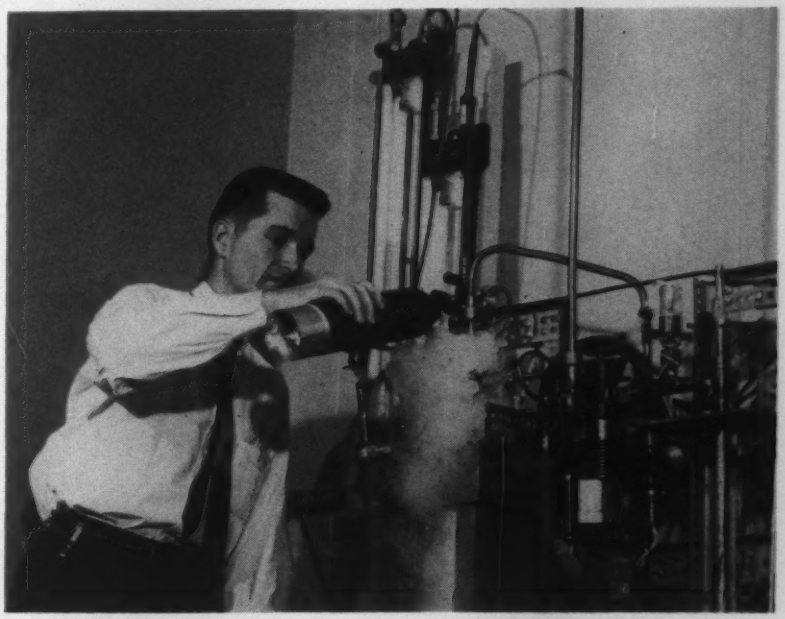
Two Goals—Dr. Goldman says Ford's cryogenic research has two goals as far as automobiles are concerned. One is learning more about materials that make up the parts of a car, and materials used in manufacturing these parts. The other is seeking new energy sources, or energy-conversion devices, for powering the car.

Cryogenics comprises about 5 to 10 pct of Ford's physics research. The staff has eight persons working in a modern, three-year-old laboratory. Equipment includes a Collins helium cryostat, which liquefies helium and maintains the temperature at which helium remains liquid; a large magnet for cooling below 1° Kelvin, or one degree above absolute zero (—459.4°F.); several calorimeters, or heat measuring devices; and other measuring equipment.

A Great Deal Learned—"So far we've learned a great deal about the elastic properties of metals at low temperatures," says Dr. Goldman. "We've also learned much about the anomalies of thermal properties of dilute alloys, which have important implications on the magnetic properties of solids. "Then, too, we're doing pioneer work on the use of one of the isotopes of helium in order to get even lower temperatures than usual for our studies."

In using cryogenics as a materials research tool, Dr. Goldman's staff is interested in gaining knowledge about materials that will some day be used in future cars.

Lighter Steel? — "Today we're doing work that another day may



COLD FACTS: Working on a nitrogen free radical experiment, Dr. J. E. Zimmerman of Ford's physics dept. pours liquid hydrogen into test apparatus. It's part of company's study in field of cryogenics.

lead us to shock-resistant glass materials of great strength, says Dr. Goldman. Such a material might replace steel. Then there's steel itself. We want to know more about what makes it tick. Some day we'd like to make a steel as strong as it is today, but half as heavy. This would mean lighter, stronger body panels, less subject to impact damage."

Dr. Goldman says the same holds true for plastics. Cryogenics could well give a clue to the development of a plastic that's as strong as today's metals, yet has the forming qualities of today's plastics.

Deep Freeze—Dr. Goldman says cryogenics value stems from the fact that "low temperature study is one of the few ways known to freeze and store some of the reactive chemical components which are possible future energy sources." He cites frozen free radicals of nitrogen as an example. "If we could extract energy from this, refine it and improve it, we could, for one thing, come up with better combustion processes."

Cryogenic study also is important because influences on materials can be controlled at low temperatures. "Through low-temperature tests, we try to determine what the ideal properties of steel and other metals are," says Dr. Goldman, "and which of these properties are caused by the motion of atoms. Steel, for instance, deforms because it has microscopic, atom-sized imperfections. If steel were made of perfect crystals, it would be virtually impossible to deform.

Power Source — Dr. Goldman says cryogenics can't be overlooked as an energy source. It may lead to new ways to convert energy into powering means. There's talk of thermoelectric conversion. Research along this line indicates a cheap source of energy would be an array of thermocouples, heated by relatively inexpensive fuels on one end, cold on the other. They'd give off power by converting chemical energy d i r e c t l y into electrical energy.

The field of air conditioning is also a fertile one for cryogenic studies. Thermo-electric materials might take the place of mechanical air conditioning-heating units, thus eliminating all moving parts.

Sunshade—Man is on the verge of learning to control the sun's rays. Cryogenics may furnish clues that may pave the way to further knowledge of the sun's effects on materials, according to Ford scientists. One possibility: Developing a glass-like substance in which tiny particles may be rotated. Electrical fields in the substance would change at the push of a button. The effect in the material would be like a venetian blind opening and closing.

Unlikely? Dr. Goldman says not. Cryogenic research in these areas has a long way to go, he admits. But at the same time, it's come a long way in the past 10 years. A decade ago, he says, nobody would admit cryogenic technology stood a chance in practical scientific application. Today it's being used importantly on our missile projects and in computers.

"We feel the importance of cryogenics will increase as new exotic materials evolve," says Dr. Goldman, "and new cryogenic techniques develop in the preparation of materials and metallurgy."

New Glass Plant Is in Operation

WINDOW WORK: Glass fabricating is now underway at Chrysler Corp.'s McGraw plant in Detroit. Eventually, the plant will furnish 50 pct of the company's fabricated glass needs for its cars and trucks.

Aluminum Saves Weight In Chrysler Cars

The average amount of aluminum found in 1960 Chrysler Corp. cars is 65 lb in 52 separate parts. It takes the place of 250 lb of iron and steel.

M. F. Garwood, chief engineer of Chrysler Engineering Div.'s Materials Laboratories, says the main reason for the rise of aluminum from 9 lb in 1947 to today's total has been to reduce car weight and cost, and to increase performance.

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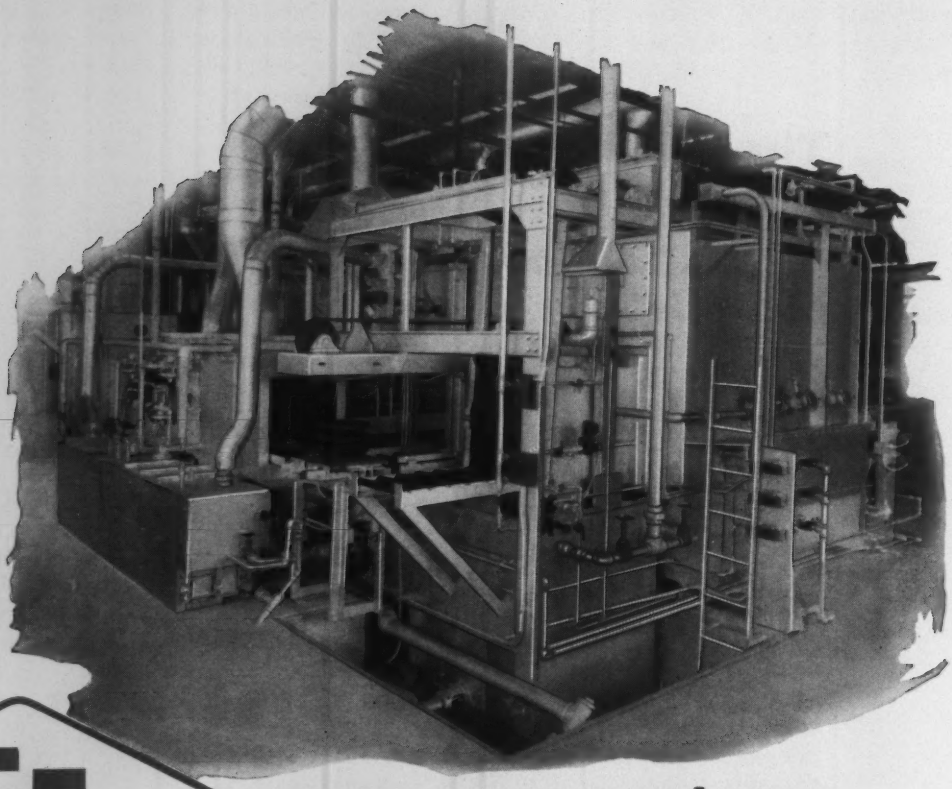

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Export Woes Converge on Capital

Industrial Heating Equipment Makers Ask Help

Industrial heating equipment exports dropped from $25.8 million in 1958 to $22.5 million in 1959.

Aid asked includes reduced foreign tariffs and broader commercial risk guarantees. — By G. H. Baker.

■ U. S. industrial heating equipment industry exports dropped $3.3 million in the past few years, the Dept. of Commerce has been told. To regain these losses, industry spokesmen say, the government must stimulate exports of the industry's products.

The heating equipment men say their industry last year exported $22.5 million in furnaces, ovens, and other equipment used in the heat treatment of metals and other materials. In 1958 it was $25.8 million.

Industry representatives, including manufacturers and trade associations, were in Washington for a Commerce Dept. conference. It was held to get ideas on how private industry can expand operations in foreign markets.

Aid Spelled Out — The export trade conferences, a weekly series, are in line with President Eisenhower's new export-push program.

The industrial heating equipment industry believes its export volume can be expanded by the easing of some restrictions imposed by foreign governments.

The representatives particularly pointed to high tariffs in the British Commonwealth and some South American countries.

One major way the government can help, they point out, is to allow broader commercial risk guarantees from the U. S. Export-Import Bank. The bank recently announced broader guarantees, also in line with the President's program. But industry spokesmen claim this is not enough to expand their exports to previous levels.

Conference Helpful — Philip A. Ray, Under Secretary of Commerce, told the group the export expansion drive is creating enthusiasm in private industry.

Mediators Needed

Costs of last year's steel strike are slowly coming to light.

In addition to the loss of revenue and direct costs of mediation, the government had to put up an extra $15,000 to pay for the fact-finding boards for the steel and dock strikes last year.

Federal Mediation chief Joseph F. Finnegan is now asking Congress to add 12 new federal field mediators to keep up with the increasing work load. This would bring the total number to 212.

Foreign Aid Eyed

Congress is taking a close look at the White House request for another $2 billion in subsidies to foreign armies.

The Pentagon tells Congress that foreign governments will have to cut back their armies by 20 pct next year if they don't get the money.

A 10-year-old reserve of funds is now exhausted, and the Pentagon complains that foreign armies are now on a hand-to-mouth basis.

Slow Decisions Retard Space Race

■ Indecision and delays at the Pentagon are pushing the U. S. farther and farther behind in the space race.

One of the shocking aspects of military fiddle-faddle at the top level is that it takes Pentagon committees longer to decide whether or not to order a missile than it does to develop and build it.

Engineers Frustrated—A leading space missile scientist, Dr. Simon Ramo, executive vice president of Thompson Ramo Woolridge, says the nation's missile engineers and management men are frustrated by slow decision-making and overly-fussy organization within the Pentagon.

The U. S. might be well on the way to a landing on Venus if the Defense Department could stop some of its wrangling. But, as Dr. Ramo points out, "Venus doesn't wait or adjust its orbit to our slow arrangement-making machinery."

Example Cited — Example of military fumbling: All equipment for the first U. S. lunar probe was designed, fabricated, and delivered to Cape Canaveral in less time than the Pentagon took to decide whether or not the program should be attempted.

New DoALL Heavy-Duty Contour Machines Make Hand Sawing More Accurate, 100% Faster

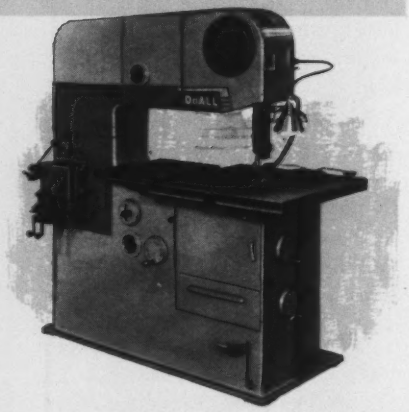
Now, for the first time, DoALL enables you to use H.S.S. bands on a fixed-table, manually fed band machine. You can speed your internal and external sawing, as well as machine filing and polishing . . . make 3-way savings. All these benefits are yours with the new, inexpensive type 2 DoALL Contour Machines:

FASTER CUTTING RATES. With Demon® high-speed steel saw bands you increase cutting rates 100%. These machines have all-welded, steel, box-frame construction to withstand the high tension needed on H.S.S. bands for high-speed cutting.

LARGER COOLANT SYSTEM. New large-volume coolant system with mist applicator gives high efficiency, prevents chip welding.

EXTRA-HEAVY-DUTY WELDER. You can weld H.S.S. saw bands up to ½ in. wide—right at the saw—with the new DoALL DBW-8 welder, now standard equipment on these machines. Its large capacity permits welding 1-in. carbon blades.

DoALL type 2 Contour Machines are built in four sizes with four throat depths of 16, 26, 36 and 60 in. Investigate these money-saving machines. Call your nearby DoALL store for demonstration or write for free bulletin.



The new DoALL type 2 Contour Machines are ideal for toolroom use. Built with sturdy, all-welded, box-frame construction, they are equipped with an efficient mist coolant system and a new heavy-duty welder.

B-60

See the DoALL Exhibit in Booth 1226 ASTE Tool Show

The DoALL Company, Des Plaines, Illinois

THIS IS A TYPICAL DoALL STORE

Why Natural Gas Market Grows

Power Needs Push Fuel Demands in Farwest

Spending by the natural gas companies in the 11 Western states this year amounts to $400 million.

The growing demands for the fuel assure a large market for metalworkers.—By R. R. Kay.

■ Power needs in the Farwest are giving a giant push to the natural gas industry.

Demands for the fuel—domestic, commercial, and industrial—assure a huge market for metalworking's products. Firms all over the country could share in this outlet for their goods and services.

West Leads Spending — Natural gas companies across the nation will put over $2 billion into new facilities this year. It's the fourth year in a row for the $2-billion-plus mark.

Once again the 11 Western States take the lead. This region alone will spend $400 million. The area's growth outpaces the industry as a whole.

Survey Available—That's the picture as GAS Magazine sees it in its soon-to-be-released Annual Survey of Construction Budgets.

The natural gas industry gobbles up a wide variety of products. It runs the gamut from pipe, valves, and compressors to automotive equipment and corrosion prevention materials.

Suppliers gearing their sales to Farwestern growth should do well. Many with plants in the region have already expanded to keep up with the growing demand.

Why They Want Gas — "Right now, and for the foreseeable future, natural gas is the one bright hope for meeting energy demands on a large-scale basis in the Farwest," reports GAS Editor Fred Ebdon.

"Coal is available, within economic limits, and so is fuel oil. But natural gas is cleaner and more economical. And it's better suited to the upgraded standard of living and more sophisticated type of industries you find in the Farwest," Mr. Ebdon says.

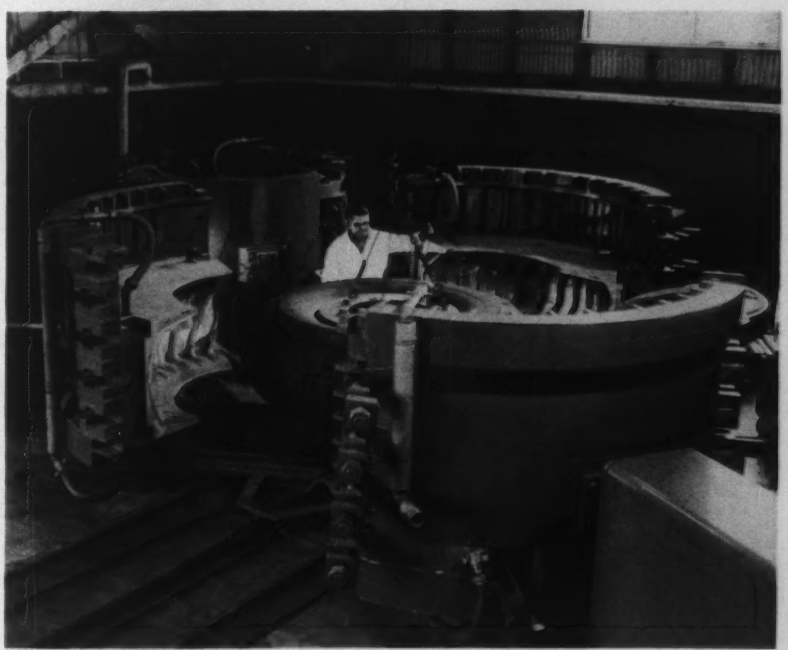
There's plenty of gas in the West for the 1960-1961 heating season. But it's going to take vast new projects to keep up with future needs. The big job underway right now: A $219 million west Texas to southern California line.

Fuel for Generators—Two other projects await an OK from the Federal Power Commission. They call for over a half billion dollars and more than a million tons of steel.

The Farwest can develop more hydraulically-generated electric power. But most of the good damsites are taken. Future projects will make power at a much higher cost per kilowatt.

Today, most major power companies turn to thermoelectric generating techniques. Natural gas is their fuel.

Handles Three Retreads at One Time



LARGEST RETREADER: Fabricated from Kaiser Steel plate, this 25-ton machine can retread three oversized tires at one time. It was manufactured by the Bacon-American Corp., Emeryville, Calif.

Predictable Performance

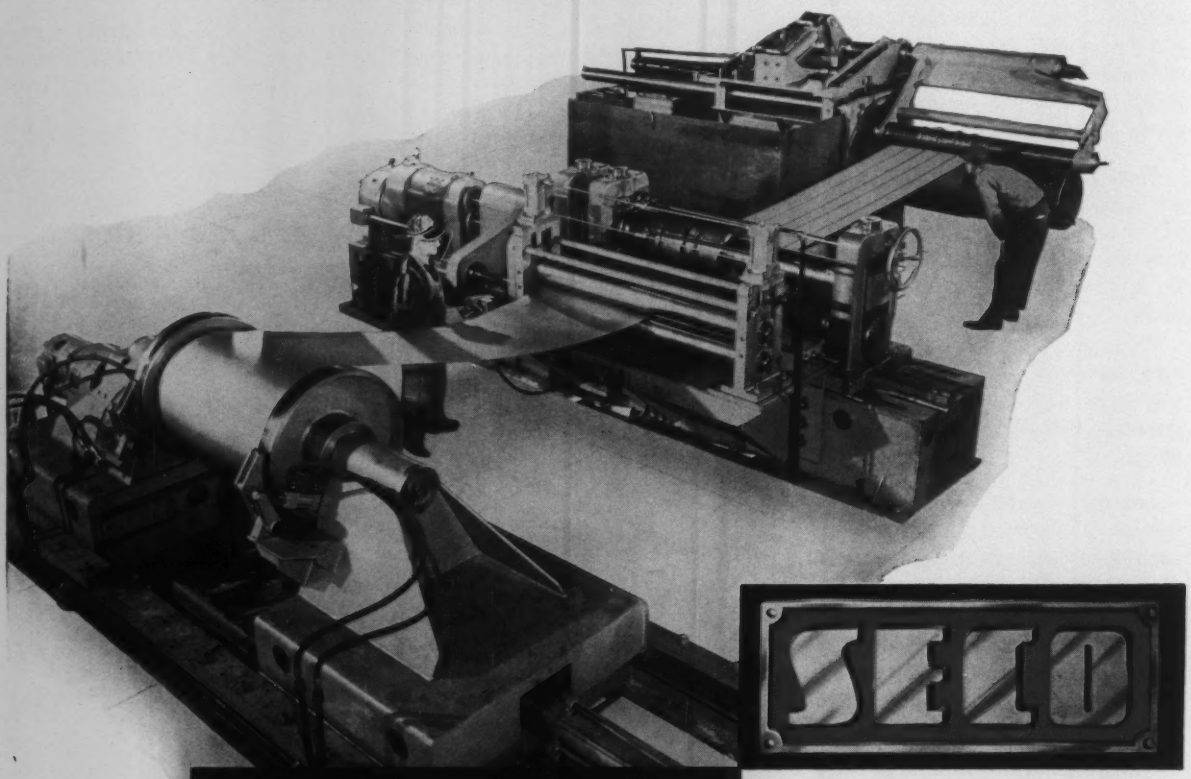
...is assured
Detroit Steel Corporation
with the installation of a

Availing themselves of SECO's facilities for custom building efficient slitting lines, the Detroit Steel Corporation, Detroit, Michigan, just recently installed this 60" Seco Slitting Line thereby assuring predictable performance. The entire unit, consisting of a cone-type Uncoiler, Slitter and Recoiler, was specifically designed and built by SECO for this customer.

Whatever your present requirements may be, call upon SECO's staff of trained sales engineers to assist you in planning for the present as well as your 'future' capacity.

SECO 60" SLITTING LINE

Seco builds a complete range of slitting lines available from 12" to maximum strip widths.



STEEL EQUIPMENT COMPANY
P. O. BOX 737, WARRENSVILLE STATION
CLEVELAND 22, OHIO

SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Slitting Lines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
- Traverse Reels for Narrow Strip
- Steel Coil Up-enders
- Scrap Ballers

Affiliated with Lee Wilson Engineering Co., Inc.

Sales Gloom Overhangs Market

Builders Tone Down Earlier Optimism

Machine tool builders are feeling the effects of recent business doubts.

With buyers adopting a wait-and-see attitude, they don't look for a big spring sales spurt.—By R. H. Eshelman.

■ Although the first quarter is expected to show the highest level of business activity in history—a $500 billion Gross National Product—pessimism and gloom still spread. And the gloom apparently covers a large segment of the machine tool industry.

However new orders for metal cutting types of machines improved in February, according to the latest figures from the National Machine Tool Builders Assn. But orders for forming equipment dropped. Export sales registered some gains.

Exports Helped—Net new orders of cutting machines in February were $48.4 million, up from $43.4 million in January. Orders for forming machines declined to $12.4 million from $13 million the previous month. Export orders for cutting tools rose $2.8 million in February.

These export orders are funneling in from the European automotive industry, principally in England and France. One builder comments: "These orders seem to be mostly for the heavy duty special machines needed for longer wear in mass production.

Few builders of either special or general machines, look for any sudden spurt of orders this spring. For instance, one firm well established in the automation field sees its backlog about the same today as in January. Perhaps it's a little above a year ago. However, inquiries seem to be dropping.

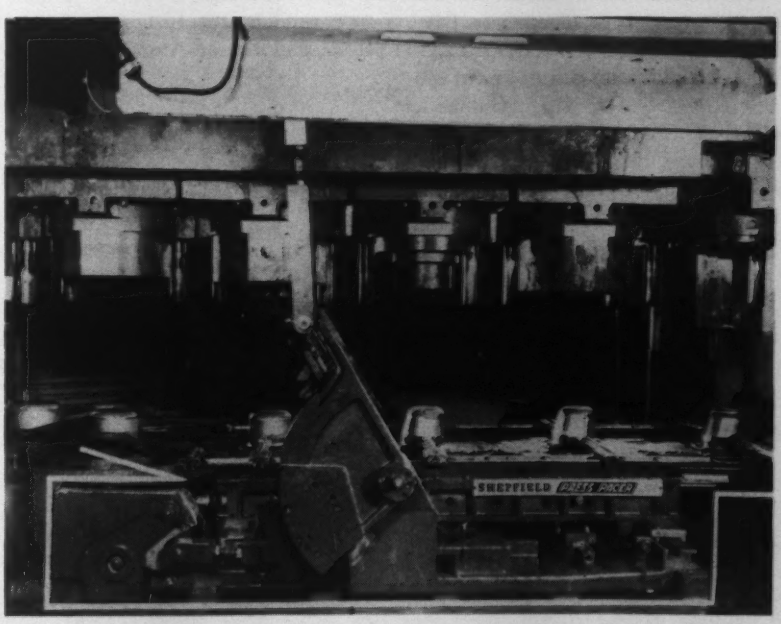
Marking Time—A district sales office for a firm that's strong in general purpose numerical units finds current prospects just fair. The manager feels this is not going to be as good a year "as we had believed." Sales all over the country are spotty and below expectations. However, he acknowledges they are above a year ago and 1960 could be better than last year, overall.

Many builders complain that there's too much of a wait-and-see attitude. Many projects seem to be marking time. Some wonder whether it's because this is an election year, because of the bearish stock market, or the disappointing showing of auto sales so far.

"We'll know better in a couple a months," is a common comment. When spring weather arrives, a pickup in auto sales could give capital goods and machine tools a shot in the arm, many feel.

How Much Retooling?—However, sources close to the auto industry see no big new programs in sight. Signs point to little new equipment being required for the 1961 compact cars. Even BOP (Buick, Olds, Pontiac) plans reportedly will largely make use of rebuilt equipment.

Unit Automates Standard Press



BOLTED TO BED: A new portable transfer unit can be used to transfer stampings from one die station to the next or to transfer parts between presses. Made by Sheffield Corp., Dayton, it's called Press-Pacer. Unit is adjustable for different spacings and also for different press strokes.

INDUSTRIAL BRIEFS

Open, and Raised—Aluminum Co. of America has increased the planned capacity of its new Warrick (Ind.) smelter, now under construction, by 25,000 tons. This will bring the operation's annual installed capacity to 175,000 tons upon completion. Initial production will begin about June 1.

From the Campus—Dr. R. A. Flinn, professor, metallurgical engineering, Cast Metals Lab., University of Michigan, has been retained as technical consultant by the Non-Ferrous Founders' Society. Dr. Flinn will work closely with the technical and marketing committees of the Society and will be available to member firms as a consultant.

Griffin Wheel Rolling—Griffin Wheel Co., Chicago, has completed its cast iron pressure pipe plant in Council Bluffs, Ia. Full production is underway. Griffin operates 11 other plants in the U. S. and Canada and a research center at Bensenville, Ill.

Refractories for Overseas—Kaiser Refractories & Chemicals Div. has consolidated its Export Sales Dept. Headquarter offices are in the new Kaiser Center Bldg., Oakland, Calif. The department will handle all export quotations, sales promotion, and market development activities in connection with overseas refractories shipments.

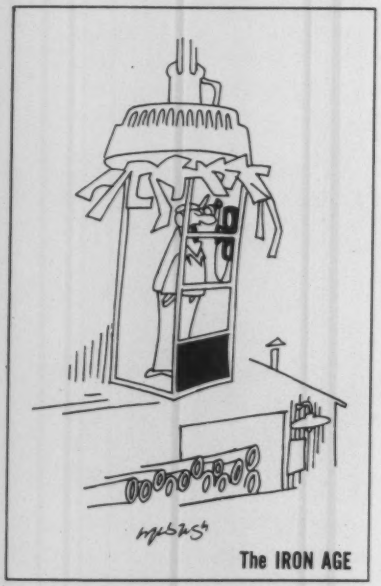
Move Into Michigan — Eaton Manufacturing Co., Cleveland, will build a new and expanded research center in Southfield, near Detroit. The cost will be about $1.2 million for building and equipment. Completion is scheduled for late 1960. The center will contain 50 pct more floor area than the company's present facility in Detroit.

Nuclear Reactor Study—Allis-Chalmers Mfg. Co. will assist the National Bureau of Standards in a nuclear reactor design study. The program is aimed to design and build a reactor for use by NBS in basic research on materials and forming standards for types of nuclear measurements. Project will be handled by A-C's Nuclear Power Dept. in Washington.

Coke Ovens Started—A battery of 59 smokeless type by-product coke ovens has been placed in operation at the Pittsburgh Works of Jones & Laughlin Steel Corp. J&L also has under construction two other batteries of 59- and 118-oven capacity. In 1961, coke capacity will be increased by about 60,000 tons monthly at the Pittsburgh Works.

New Plant—Air Products, Inc., Allentown, Pa., is installing an ultra-low temperature plant at Iselin, N. J. It has built and operates almost all of the government's liquid hydrogen and liquid oxygen facilities. These substances will be commercially produced and distributed by Air Products on the East Coast next month.

Indian Aluminum — Aluminum producing facilities are being built for Hindustan Aluminium Corp., Ltd., India, at a cost of about $30 million. It is a joint-venture project sponsored by the Birla interests of India and Kaiser Aluminum International. Completion is scheduled for 1962.



". . . Hold on a minute Fred."

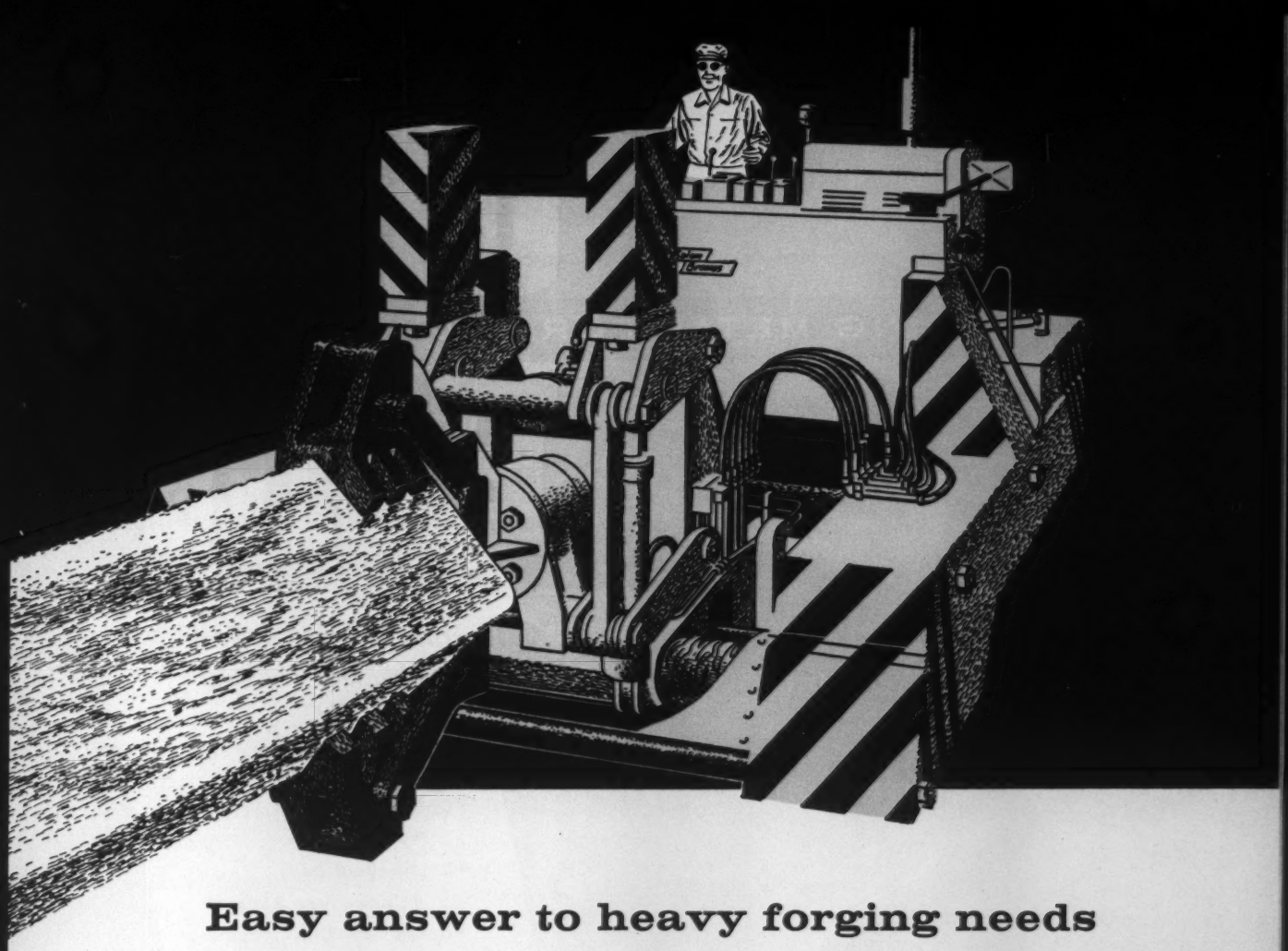
Furnace Ordered—Sierra Metals Corp., Wheeling, Ill., has ordered from F. J. Stokes Corp., Philadelphia, an induction-heated vacuum melting furnace. The furnace is designed for volume production of Sierra Metals' new nickel and cobalt base jet engine alloys. It will have a nominal rated capacity of 4,000 lb.

New Warehouse—The Stanley Works has completed its new office and warehouse at 205 Armour Dr., N. E. in Atlanta, Ga. It will house regional sales and warehouse operations of Stanley Hardware, Stanley Steel Strapping and Stanley Electric Tools divisions. The regional sales office for the Stanley-Judd drapery hardware division will also be located here.

New Management Company—The Westover Corp., Milwaukee, has separated from its former foundry equipment manufacturing division. This division has been organized into a separate corporation. The Westover Corp. will be devoted entirely to management service work. It has specialized in work measurement, methods, plant layout and cost control consultation for metalworking plants.

New Order — Birdsboro Corp., Birdsboro, Pa., has received a contract to engineer and build a three-stand tube sizing mill. It is for the South Chicago Works of Republic Steel Corp. A single 500 hp constant speed AC motor will drive all three stands on the mill. Delivery of the equipment is expected early in 1960.

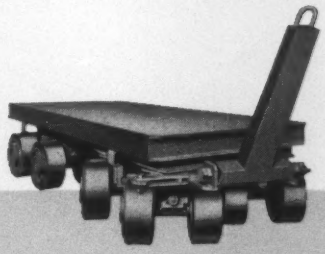
New Company—Metronics, Inc., has been formed with general offices and new manufacturing facilities located at 240 Humphrey St., Englewood, N. J. The company produces tungsten and molybdenum rod, wire and electrodes; tantalum and columbium rod and wire, and special alloys. It will offer nation-wide sales and technical services on specialized metallurgical products.



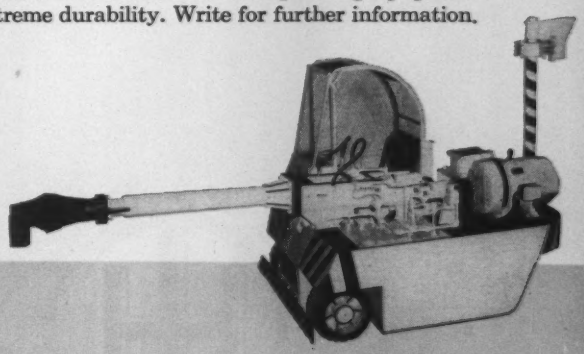
Easy answer to heavy forging needs

The free-moving Salem-Brosius rubber-tired manipulator adds speed, safety and economy to open-die forging. At hammer or press it raises, lowers, tilts, rotates or laterally moves the hot stock, satisfying forge manipulating requirements. Also, it can charge or draw forge shop furnaces, operating with the facility of a fork-lift truck in hot or cold stock handling. The Salem-Brosius Manipulator saves floor space. It travels to furnaces and presses or hammers without freezing floor space with tracks or overhead areas with craneways.

This ruggedly-built machine meets the trend of industry toward hammer and press forging of high alloy, stainless and tool steels, and the many new extremely hard refractory-type alloys. The forging of these metals necessitates manipulating equipment of extreme durability. Write for further information.



Two other prominent members of the Salem-Brosius family of materials handling equipment are heavy-duty in-plant trailers (left) and the exclusive rubber-tired type furnace chargers shown at the right. Ask about them when you inquire about the manipulator.



SALEM-BROSIUS, INC.

PITTSBURGH, PENNSYLVANIA

Salem Engineering Limited, Toronto, Ontario • Salem Engineering Co., Ltd., London & Milford, England • Salem-Brosius, S.A., Luxembourg • Salem-Brosius, S.A., Paris, France • Alloy Manufacturing Corp., Pittsburgh, Pennsylvania • R. H. Freitag Manufacturing Div., Akron, Ohio • General Ionics Corp., Pittsburgh, Pennsylvania

Ohio Rolls

SHAPING METAL FOR ALL INDUSTRY

Ohio Iron and Steel Rolls

- FORGED AND HARDENED STEEL ROLLS
- Carbon Steel Rolls
- Ohioloy Rolls
- Ohioloy "K" Rolls
- Flintuff Rolls
- Double-Pour Rolls
- Chilled Iron Rolls
- Denso Iron Rolls
- Nickel Grain Rolls
- Special Iron Rolls
- Nioloy Rolls

THE OHIO STEEL FOUNDRY CO., LIMA, OHIO

PLANTS AT LIMA AND SPRINGFIELD, OHIO... *Virtually at the center of the steel industry*

D. C. McCarthy, named administrative vice president, Pratt & Whitney Co., Inc., West Hartford, Conn.

The Hanna Furnace Corp.—**A. J. Macdonald,** named president.

The Dow Chemical Co., Dowell Div.—**A. C. Polk,** appointed executive vice president and general manager, Tulsa, Okla., headquarters.

Houston Fearless Corp.—**E. J. Horkey,** appointed vice president, engineering.

Pioneer Engineering & Mfg. Co., Inc.—**R. T. Curcurn,** appointed a vice president of the company and general manager, Wettlaufer Mechanical Engineering Div.

Seneca Wire & Mfg. Co.—**F. A. Bormuth,** elected vice president.

The Electric Autolite Co.—**C. E. Vancil,** elected a vice president.

Heppenstall Co.—**E. E. Richardson,** appointed manager, Bridgeport, Conn., plant.

Revere Copper & Brass Inc., Foil Container Div.—**K. J. Brundage,** appointed sales manager and asst. general manager.

Penn Metal Co., Inc., Expanded Metal Div.—**A. A. Smith,** appointed sales manager.

Kaiser Aluminum & Chemical Corp., Products Div.—**J. F. Donohue,** named general manager.

The New York Air Brake Co., Aurora Pump Div.—**M. A. Prigmore,** appointed controller.

Inductotherm Corp.—**T. R. Kennedy,** becomes engineering assistant to the president.

Almetco, Inc.—**C. J. Huffman,** appointed manager, aluminum extrusion plant at Nesquehoning, Pa.

General Electric Co.—**D. E. McLemore,** appointed manager, employe and community relations, Gear Motor and Transmission Components Dept., Paterson, N. J.

Whithead Metals, Inc. — **E. F. Dunn,** appointed manager, Syracuse branch.

J. L. Daniell, named vice president-general administration, Jessop Steel Co., Washington, Pa.

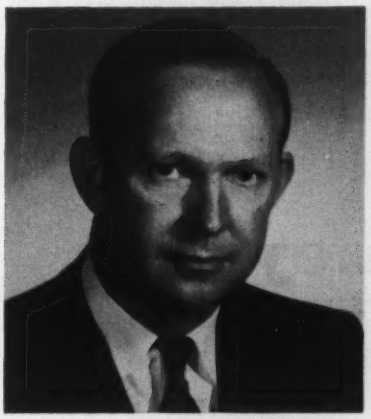
Air Reduction Sales Co.—**J. S. Stevens,** appointed district manager, Birmingham office.

SKF Industries, Inc.—**D. P. Haggerty,** appointed buyer.

Norton Co.—**F. G. Gustafson,** appointed supervisor, Process Engineering Dept. in Plant 7.

The Carpenter Steel Co., The Alloy Tube Div.—**J. L. Mitchell,** named branch manager, Chicago; **S. L. Hoagland,** named Indianapolis

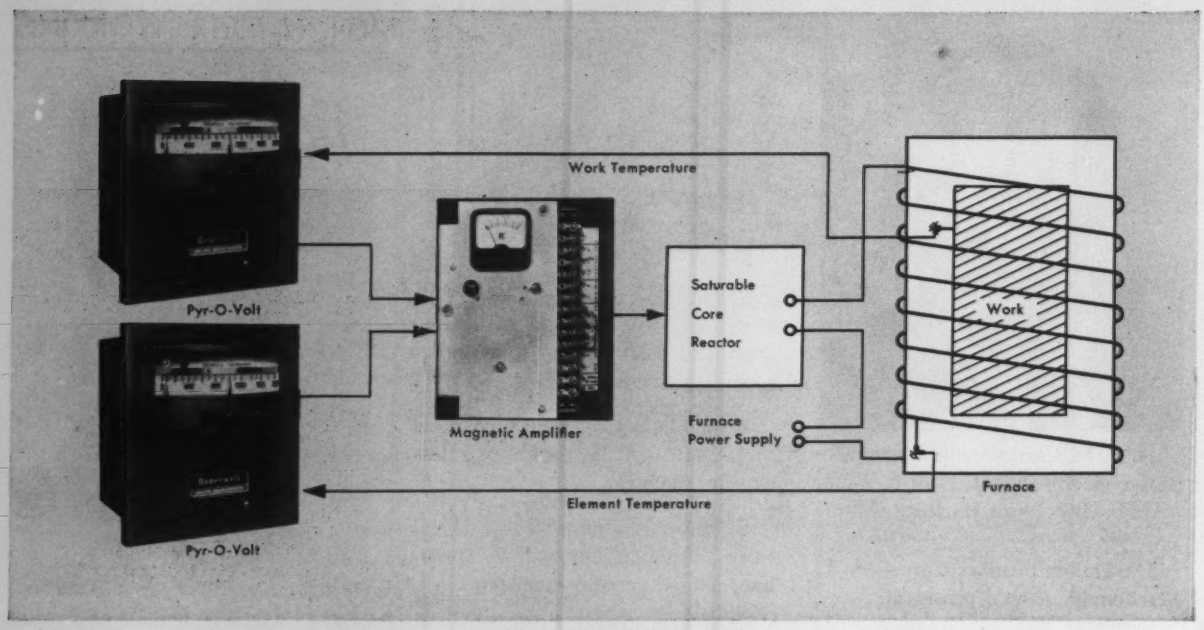
(Continued on P. 81)



H. C. Holmes, appointed vice president, marketing, Kaiser Aluminum & Chemical Corp.

R. G. Boyd, appointed vice president, sales, Kaiser Aluminum & Chemical Corp.

J. W. Watson, named vice president, Kaiser Aluminum & Chemical Sales Inc.



Electric furnace control system prevents overshoot, protects heating elements

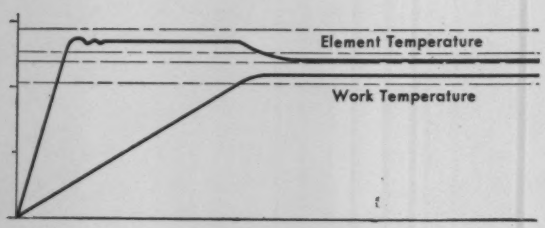
Here's the simplest, most economical way to bring electric furnace temperatures up to work level rapidly and safely using saturable reactor control.

This accurate Honeywell system holds fast-rising furnace temperature to a safe value as the slowly-increasing work temperature approaches its control point. The system consists of two *Pyr-O-Volt* controllers and a magnetic amplifier. Both controllers feed signals to the magnetic amplifier until work temperature reaches set point, then the work temperature controller assumes primary control of the system.

This relatively inexpensive system requires minimum maintenance, as no relays or other mechanical switching means are used. Both controllers have provision for fail-safe thermocouple burnout protection. In addition, automatic current limiting can be supplied with the system should you require extra protection for molybdenum heating elements.

Your nearby Honeywell field engineer can give you complete details on applying this system to advantage in your plant. Call him today . . . he's as near as your phone.

MINNEAPOLIS - HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.



Curves show the relationship of work temperature and element temperature vs. time in the *Pyr-O-Volt* furnace control system.

Honeywell

First in Control

SINCE 1885

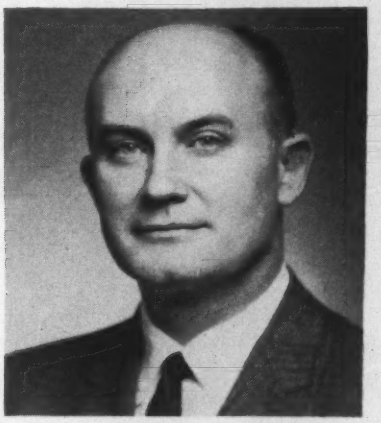
75th YEAR

PIONEERING THE FUTURE

(Continued from P. 79)

branch manager, and **S. P. Salarano,** becomes St. Louis branch manager.

Jones & Laughlin Steel Corp.—**R. F. Good,** appointed asst. district sales manager, Detroit office; **J. B. Powel,** promoted to asst, district sales manager, Philadelphia office.



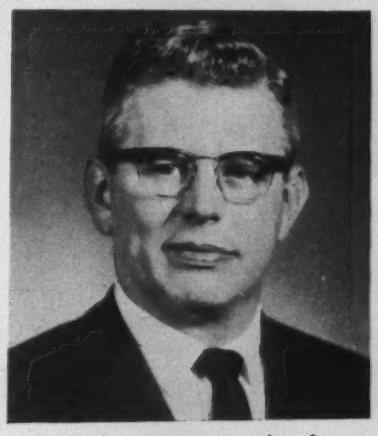
D. N. Wait, named general manager, Kemet Co., Div. of Union Carbide Corp., Cleveland.

Minneapolis - Honeywell Regulator Co., Datamatic Div.—**D. F. Brosnan,** appointed Detroit branch manager.

Adamas Carbide Corp.—**F. W. Hogan,** appointed marketing manager, and **W. T. Bradley,** named field sales manager.

The Fairfield Engineering Co., Standard Products Div.—**L. H. DeVilling,** appointed sales manager.

H. W. Rowles, appointed manager, structural and plate products, U. S. Steel Corp.



D. L. Armstrong, appointed asst. manager, structural and plate products, U. S. Steel Corp.

Thor Power Tool Co.—**Peter Rebechini,** named chief engineer, Aurora Works.

Barnes Drill Co.—**Don Greenberg,** named chief engineer, Rockford, Ill.

Dole Valve Co.—**G. E. Veino,** appointed manager, product forecasting and sales analysis, Morton Grove, Ill.

J. M. Dill, appointed special products sales manager, Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

H. K. Porter Co., Inc., Delta-Star Electric Div.—**N. E. Shipley,** appointed sales manager, Thomas Works in Lisbon, O.

Allegheny Ludlum Steel Corp., Forging & Casting Div.—**W. H.**

(Continued on P. 84)

it's dependability that counts !

Yes, *life* often rests on the dependability of the fastener.

Whether for bridges, pressure piping, skyscrapers, railroads, transformers or tunnels . . . or even your personal car, it's the *dependability of the fastener* that counts. The fastener must be *stronger . . . more dependable* than the part.

When you visit our manufacturing facilities and control laboratories, you will see for yourself how we build dependability into our IMPACT-FORM'D nuts, bolts and screws.

IMPACT-FORM'D Screw and Bolt fasteners are produced to customer demand every day:

- free—or interference-fit rail bolts
- high strength heat treated bolts for heavy construction
- close tolerance components for machinery
- screws for electronic equipment and accessories

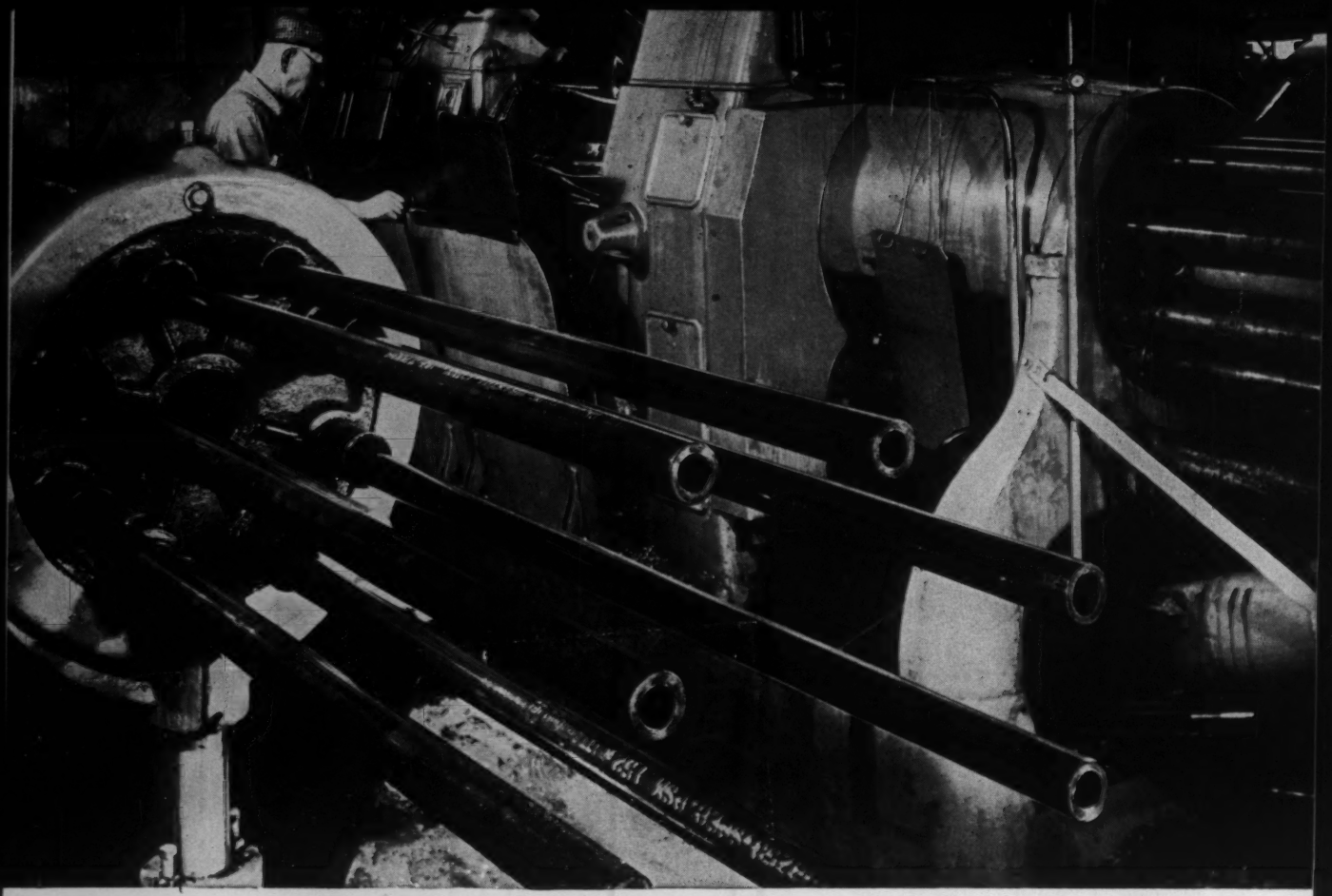
Whether you follow industry standards or have your own specifications, IMPACT-FORM'D Screw and Bolt fasteners have the *dependability* you need.

VMA 6007

SCREW AND BOLT CORPORATION OF AMERICA
P. O. Box 1708 Pittsburgh 30, Pa.

DIVISIONS: *Pittsburgh Gary · Southington Hardware American Equipment*

America's Most Complete Line of Industrial Fasteners



Bearings in the making are these lengths of Pittsburgh seamless mechanical tubing in the charging rack of a high-speed automatic cutting machine at the plant of a leading bearing manufacturer. Special machining, hardening properties are built into tubes for this customer who produces more than 6,000 inner-rings per day.

Leading Bearing Maker Finds . . .

Machinability of Pittsburgh Steel's Tubes Lengthens Tool Life, Gives More Pieces

One of the nation's oldest and largest ball bearing makers used alloy bars for high-speed machining of a difficult bearing part for 20 years.

But when Pittsburgh Steel Company showed how low-carbon steel tubes could provide the machining and case-hardening properties required, this big-name manufacturer switched to Pittsburgh seamless mechanical tubing.

These were the clinchers:

- **More pieces per day**
- **Longer tool life**
- **Less machining and scrap**
- **Lower cost material**

The part involved was the inner-ring of a clutch throw-out bearing—a heavy production item at this customer's biggest plant since 1937. The bearing is the part that takes the abuse from the spinning clutch pressure-plate when you step on the clutch pedal.

To produce the inner-ring from low carbon steel, the customer demanded seamless tubing that was:

Highly machinable and uniform—for charging into a battery of 8-spindle automatic screw machines which subject each piece to 16 cutting operations.

Exceptionally hardenable and fine grained—for heat-treating to the hardness demanded of bearing steel and for finishing to ultra-close tolerance and super-fine surface.

The customer specified the grade of steel he needed to obtain these properties — AISI C-1024 — then asked Pittsburgh Steel's sales engineers to produce it in seamless mechanical tubing.

The bearing maker's automatic machines produce 6,000 to 6,500 bearing inner-rings a day, testing the tubing's machinability with cutting tolerances as little as .003 inch.

Its hardening properties are

proven in a 21½-hour carburizing-hardening-temper cycle.

Structural characteristics meet the test in an integrated finishing-assembly operation that includes grinding and honing, and two 100 percent test operations.

The bearing maker's superintendent of primary operations sums up the advantages of Pittsburgh Steel's mechanical tubing this way:

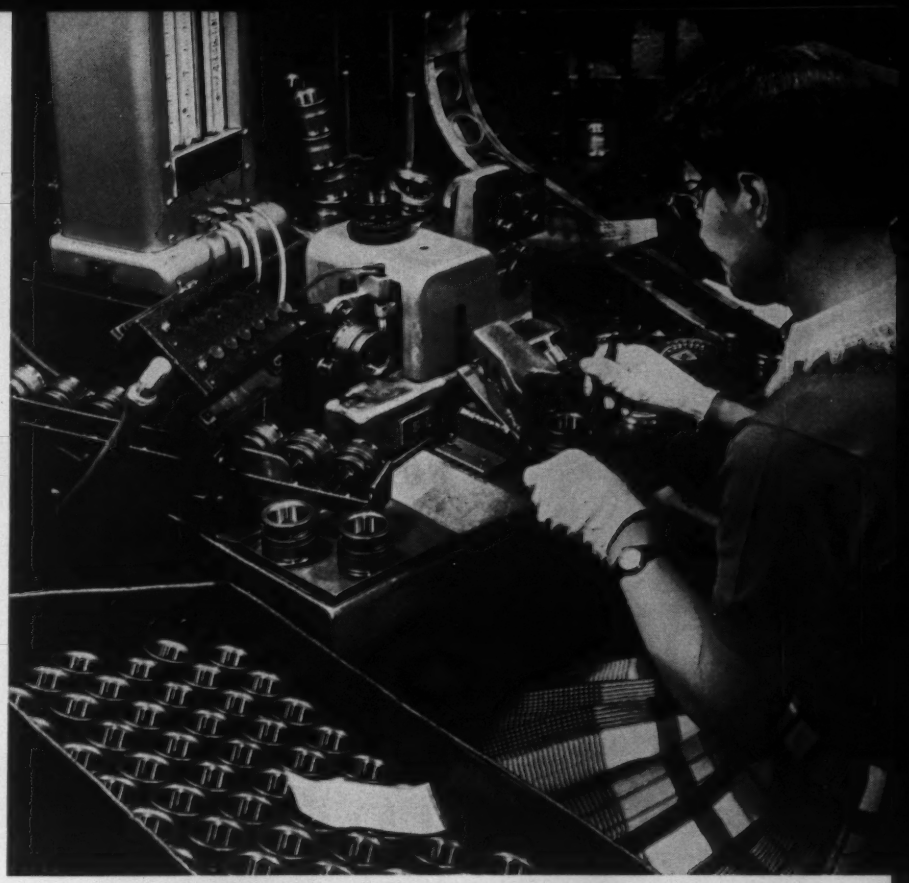
"We get more pieces during a day's operation. And we don't have as many chips to pull.

"We can use a boring tool and this stays in service longer than the drill needed for bar stock. Other tools used for ID cuts also stay in longer. So there we have lower tool costs.

"Finally, we are using a less expensive steel and gaining cycle speed. Since the inside drill speed is the controlling factor on cycle speed for bar stock, the elimination of this operation and the substitution of a boring tool permits cycle speeds of 25 seconds for tubing compared with 28 seconds for alloy bar stock or a little over 10 percent reduction."

This customer's experience with Pittsburgh Steel's seamless tubing—the advantages, the quality, the results—is typical of Pittsburgh Steel's ability to supply tubular products for special applications and of its ability to help customers obtain more profitable production.

These same benefits can be tailored to the needs of your operation requiring seamless mechanical tubing or any of the other tubular products made by the skilled tubemakers at Pittsburgh Steel Company.



Initial assembly—one of two 100 percent testing operations—is where seamless shows its merits in finished bearing.

Tubing proves its machinability here where it takes 16 boring, reaming, grooving, recessing and burnishing cuts.

Pittsburgh Seamless Distributors

Baker Steel & Tube Company
Los Angeles, California

Chicago Tube & Iron Company
Chicago, Illinois

Cleveland Tool & Supply Co.
Cleveland, Ohio

Drummond, McCall & Co., Ltd.
Montreal, Quebec, Canada

Edgcomb Steel Company
Philadelphia, Pennsylvania

Gilmore Steel & Supply Co.
San Francisco, California

Earle M. Jorgensen Co.

Perry Kilsby, Inc.
Los Angeles, California

Mapes & Sprowl Steel Co.
Union, New Jersey

Metal Goods Corporation
St. Louis, Missouri

Miller Steel Company, Inc.
Hillside, New Jersey

A. B. Murray Co., Inc.
Elizabeth, New Jersey

C. A. Russell, Inc.
Houston, Texas

Ryerson, Joseph T. & Son, Inc.
Chicago, Illinois

Solar Steel Corporation
Cleveland, Ohio

Steel Sales Corporation
Chicago, Illinois

Tubular Sales
Detroit, Michigan

Ward Steel Service Company
Dayton, Ohio

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Atlanta, Chicago, Cleveland, Dayton, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Tulsa, Warren, Ohio

(Continued from P. 81)

Herman, appointed plant manager and **W. A. Croyle,** appointed acting plant accountant, Los Angeles plant.

Sorensen & Co.—**A. L. Koehler,** appointed manufacturing manager, S. Norwalk, Conn.

H. K. Porter Co., Inc., Vulcan-Kidd Steel Div.—**F. C. Stebbins,** appointed asst. to the vice president and general manager.

The W. W. Sly Mfg. Co.—**R. G. Whitlock,** promoted to asst sales manager, Cleveland.

The Allen Mfg. Co.—**John Kraus,** appointed field sales representative, southern Ohio.

Taylor Fibre Co.—**P. J. Longarzo** and **T. E. Coyle,** appointed sales engineers.

Wales Strippit, Inc.—**Donald Newell,** promoted to tool and methods engineer.

G. E. Herrman, named manager, transportation sales, Aluminum Co. of America.

Sorensen & Co.—**Julie Polis,** promoted to asst. sales manager.

Stromberg-Carlson Div., General Dynamics Corp.—**C. W. Burrows, Jr.,** appointed director, headquarters sales.

Climax Molybdenum Co.—**J. R. Lampman, Jr.,** named sales representative, eastern foundry sales.

Byron Jackson Pumps, Inc.—**F. H. Trones,** appointed Midwestern regional manager.

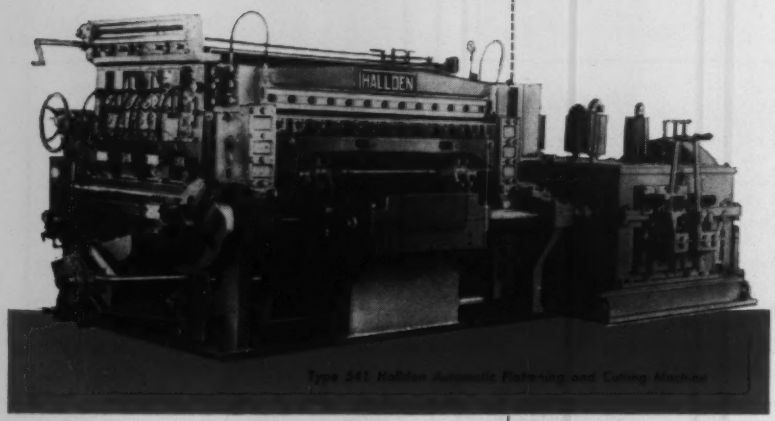
R. M. Hadcock, appointed superintendent, Blast Furnace Dept., Republic Steel Corp., Warren, O.

U. S. Steel Corp.—**L. E. Ringger,** named asst. to the general superintendent, Geneva Works.

Wheeling Steel Corp. — **W. T. Brooks,** appointed director, industrial relations.

Stamco
announces

the addition of [redacted] equipment to their complete line of steel mill equipment. Hallden and Stamco, teamed together...available from one source for complete integrated planning.



Type 541 Hallden Automatic Flattening and Cutting Machine

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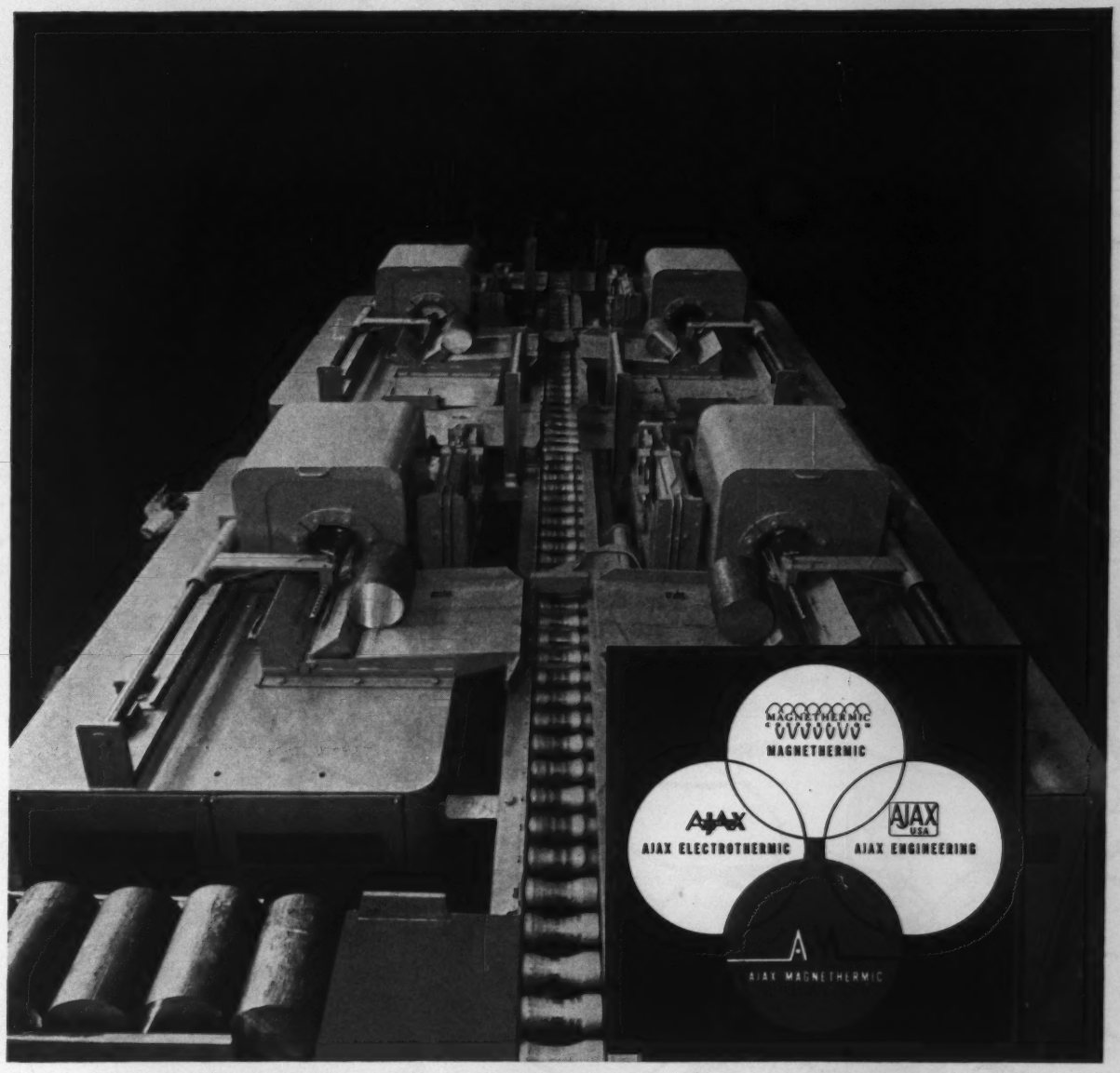

At Scovill Manufacturing Company, Waterbury, Connecticut, these four Ajax Magnethermic Induction Heaters heat 9" x 16" copper and brass billets for a 2500 ton extrusion press at the rate of 60 billets per hour. Each heater is rated 450 KW. The four heaters in tandem are served by a common loading and unloading conveyor.

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YOUNGSTOWN DIVISION
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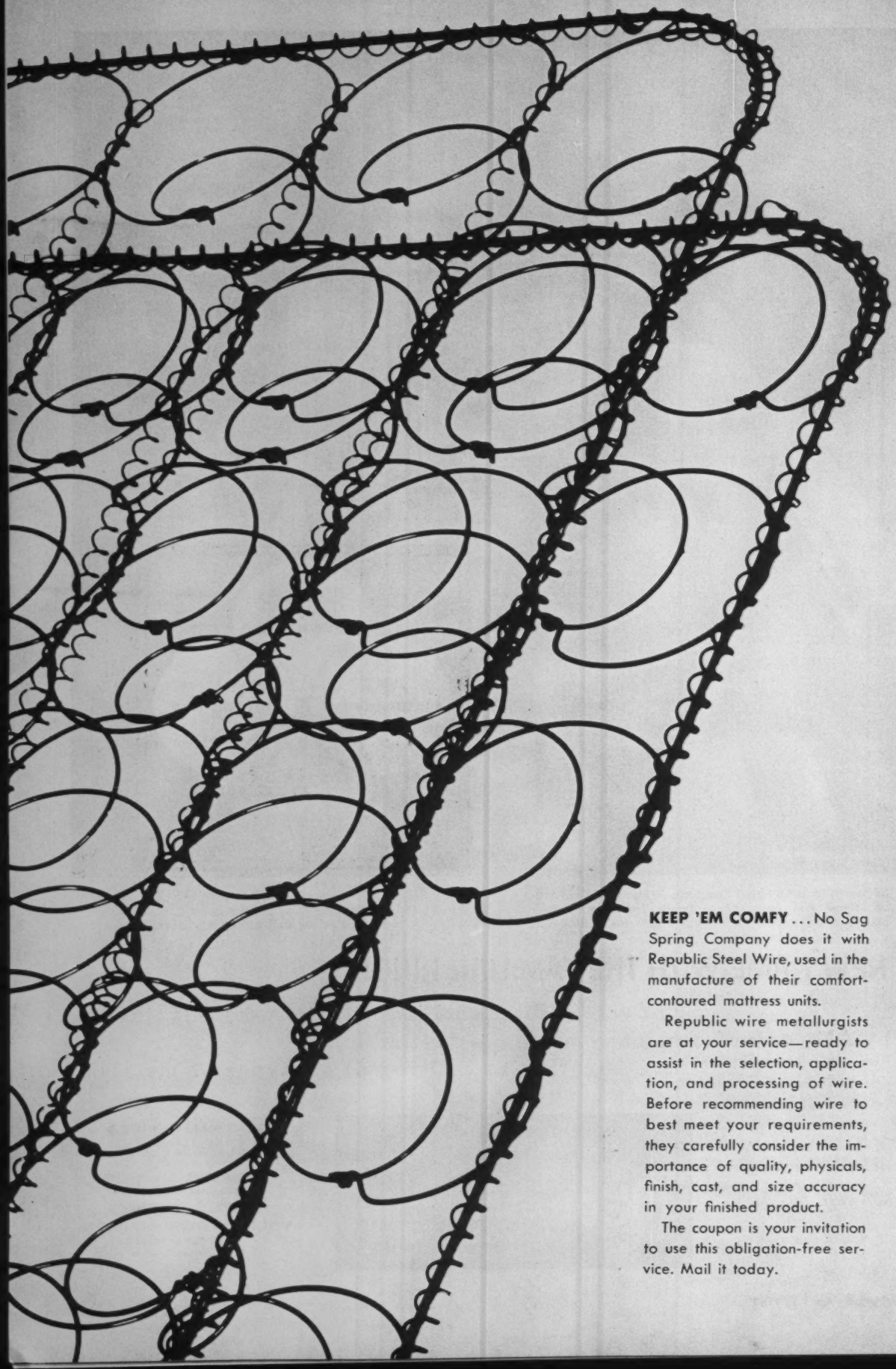

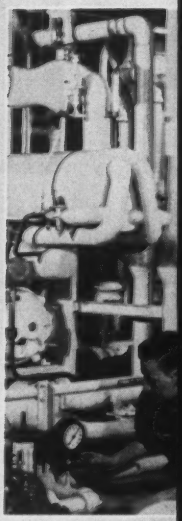

KEEP 'EM COMFY... No Sag Spring Company does it with Republic Steel Wire, used in the manufacture of their comfort-contoured mattress units.

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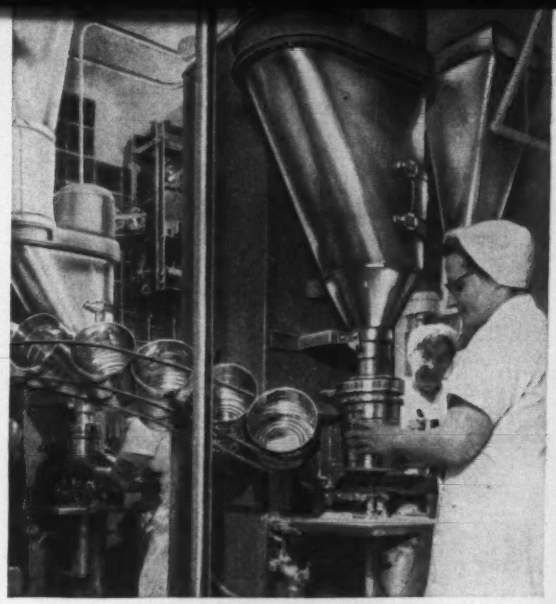
The coupon is your invitation to use this obligation-free service. Mail it today.



CONVENIENCE, sanitation, and quality protection—yours when you send your product to market in cans made of Republic Tin Plate. Republic Electrolytic Tin Plate is ideal for food, oil, paint, and beverage containers—is made by the cold reduction process which provides all the properties necessary for making tin containers on high-speed automatic machines.

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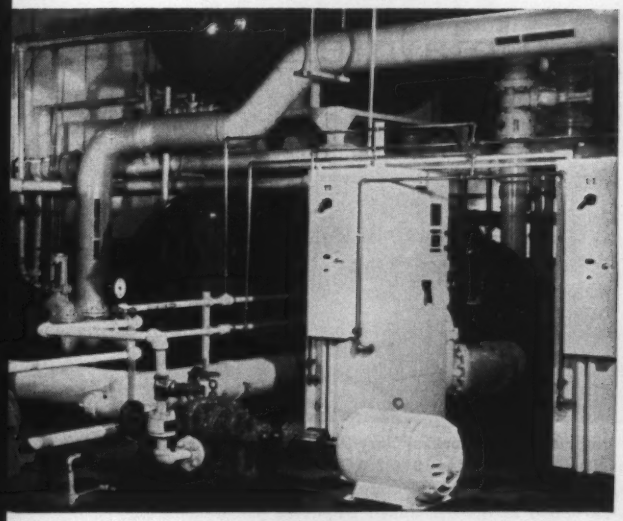

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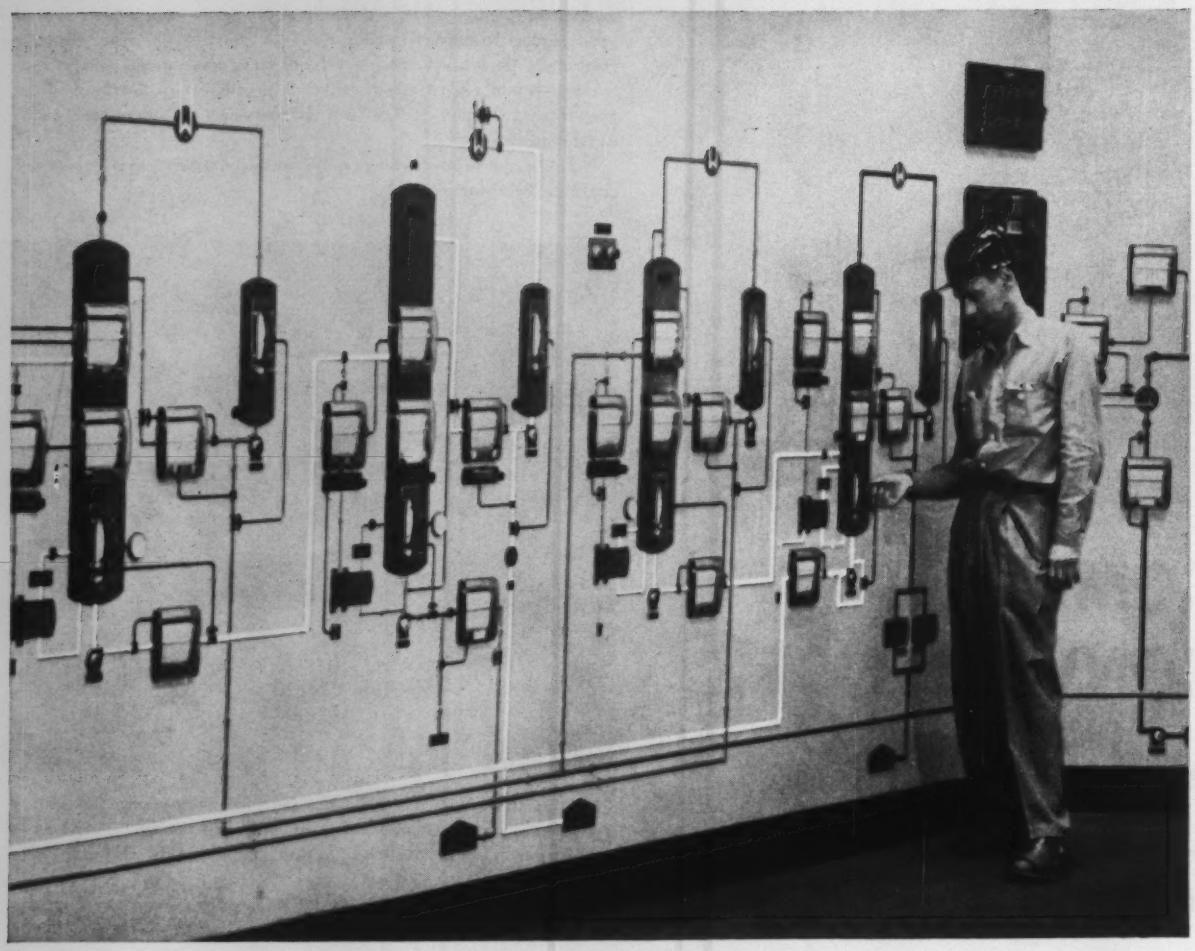
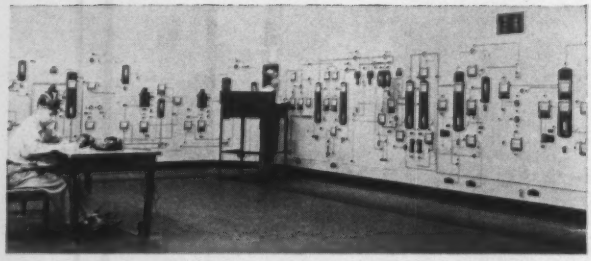


Foxboro Consotrols* "easy on maintenance" at U. S. Steel's Gary Works

Foxboro Consotrol Instruments have been in service 5 years at U. S. Steel's Gary Works, yet only a few have ever needed calibration. In fact, Gary Works reports that many of the Foxboro M/58 Controllers have never even had their covers off.

Low maintenance is just part of the Foxboro Consotrol story. Sustained high accuracy, precise repeatability, a full range of control functions — you get them all when you specify Consotrol instrumentation. Get full details in Bulletin 13-18, or call your nearby Foxboro field engineer. **The Foxboro Company, 804 Neponset Ave., Foxboro, Mass.**



83 foot graphic control panel for Gary Works Light Tar Distillation Plant was built by Foxboro in 1954. 250 Consotrol instruments record and control all temperature, pressure, flow and liquid level variables. *Consulting Engineers:* United Engineers and Constructors, Inc., Philadelphia.

*Reg. U.S. Pat. Off.

FOXBORO

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PERFECT MATE: The carbonyl process will produce a finished die, exact in detail to the master mold.

Nickel Process Makes Patterns Without Costly Machining

Orders for intricate dies and molds often mean a wait of several months.

A new nickel carbonyl process now cuts this time down to weeks.

■ Does your present production demand top performance from dies and expendable foundry equipment? Are these parts intricate in shape? And are costs high because of the machining required to produce them?

The answer to these problems could lie in a new gas-deposition technique that actually produces pure nickel duplicates from original masters. The advantages of this process are manifold.

Four years of research stand behind this process. Work was carried out at The Budd Co., Philadelphia, in an effort to get more mileage out of its metal-stamping lines. Budd's success with nickel forming dies and molds made by the new process led the company to offer these custom-designed end products to industry.

The company's new facility, Carbonyl Metal Products, Conshohocken, Pa., now produces a variety of dies and molds using the carbonyl process.

Quick Shipments—According to J. O. Trimble, general manager, the unusual method not only by-passes costly machining, but it gives longer life to the dies and molds produced. Naturally, such a setup greatly reduces delivery time on foundry equipment.

Just the end product will be marketed by The Budd Co. All a customer does is send in a "master." It can be made of wood, plastic or metal. With very little delay, the customer receives an exact dupli-

PLATING CONTROL: Operator adjusts the proper flow of nickel-carbonyl gas into the deposition chamber from his control panel.

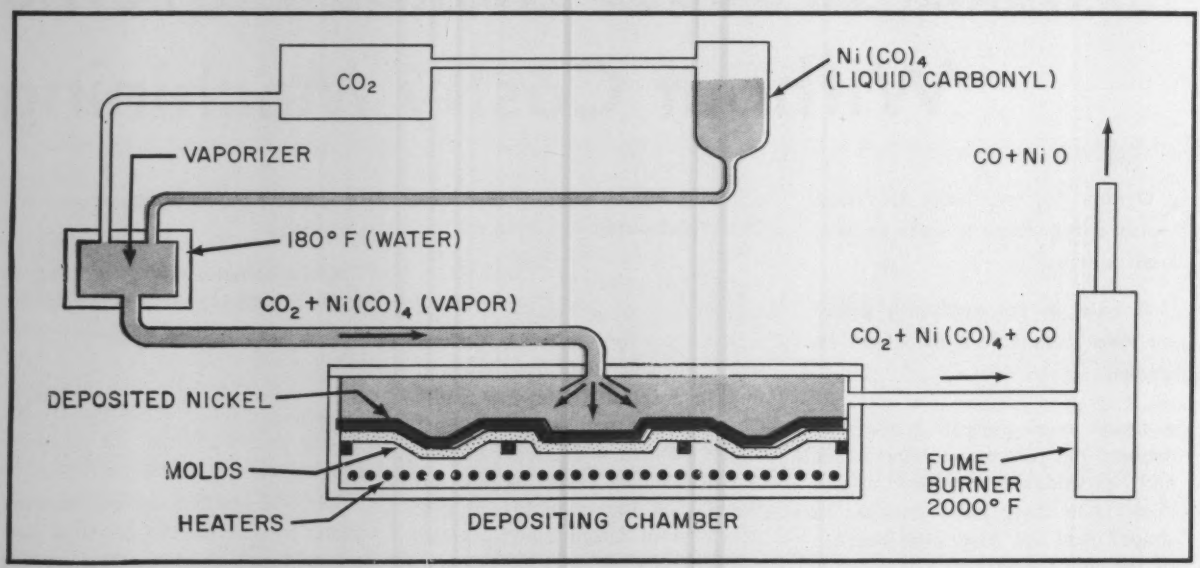
cate of the original in pure nickel.

The more complex your pattern, the lower the cost as compared with conventional machining techniques. Average over-all tolerances of ±0.005 in. are being maintained. Pattern size can be as small as 1 x 1 in. or as large as 60 x 100 in. Add to these dimensions a corresponding range in depth, too.

Big Market—At present, Budd is busy turning out such parts for the auto industry. Some of the current uses include forming dies for body parts, patterns for engine parts and transmission extension bearing retainers. And carbonyl-nickel patterns and core boxes for complete aluminum engine-block castings are now feasible with the process.

Other advantages stem from the material itself. First of all, it's tough. In fact, carbonyl-nickel foundry patterns run somewhere between 181 and 221 Bhn. Such a pattern work-hardens under the impact of sand from sand slingers, blowers and rammers. For example, one auto maker reports that its carbonyl nickel pattern shows no

How Carbonyl Process Forms Nickel Shells



FROM LIQUID TO SOLID: Process begins with liquid nickel carbonyl which is "pumped" through by positive pressure of CO_2. Liquid enters vaporizing chamber where it is converted to a gas before entering the deposition chamber. Nickel buildup is molecular in character and thickness is proportional to time.

appreciable wear, even after 100,000 impressions.

Aside from its high resistance to abrasion, these patterns also have excellent resistance to heat checking under high thermal cycles. The properties of carbonyl-nickel? Melting point: 2600°F; tensile strength: 85,000 to 95,000 psi; and elongation: 15 to 20 pct.

Absorbs Shock—Another advantage is the material's high thermal shock properties up to 1600°F. This permits rapid cooling or quenching, something you can't do with cast irons or steels.

There's virtually no porosity in carbonyl nickel. Repeated use of such a pattern just makes it brighter and smoother. Thus, it provides very good drawing properties (using a minimum of release agents) with most types of sand.

The material doesn't adhere to steel or similar metals when used in drawing or forming dies. This eliminates any chance of pickup between the die face and the sheet metal (cold welding) during impact. The results? No scoring of the steel can occur.

No point in using lubricants either. That cuts out the need for special equipment, and subsequent cleaning of the formed metal.

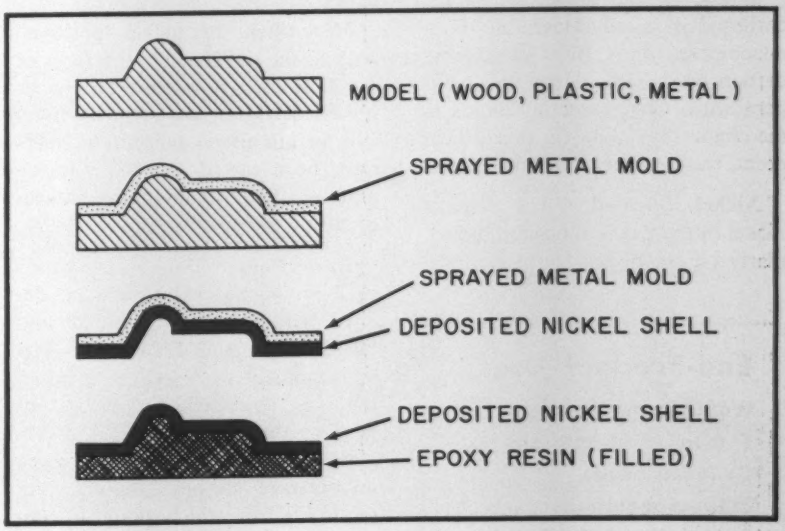
Easy to Weld—Carbonyl nickel patterns are easy to maintain and repair. This is the case even in severe or heavy-duty service. You can weld the material using gas- or arcwelding methods. The material also lends itself to brazing and silver soldering. Add lead-tin soldering to the list, too.

The process begins as soon as a model is received from a customer. First, the model is cleaned and inspected. A release agent is then applied to the surface. Next, a special eutectic compound is sprayed onto it. This spray continues until a metal mold (about ½ in. thick) is formed. This becomes a "negative" of the original model. And it's removed through the previously-applied release agent.

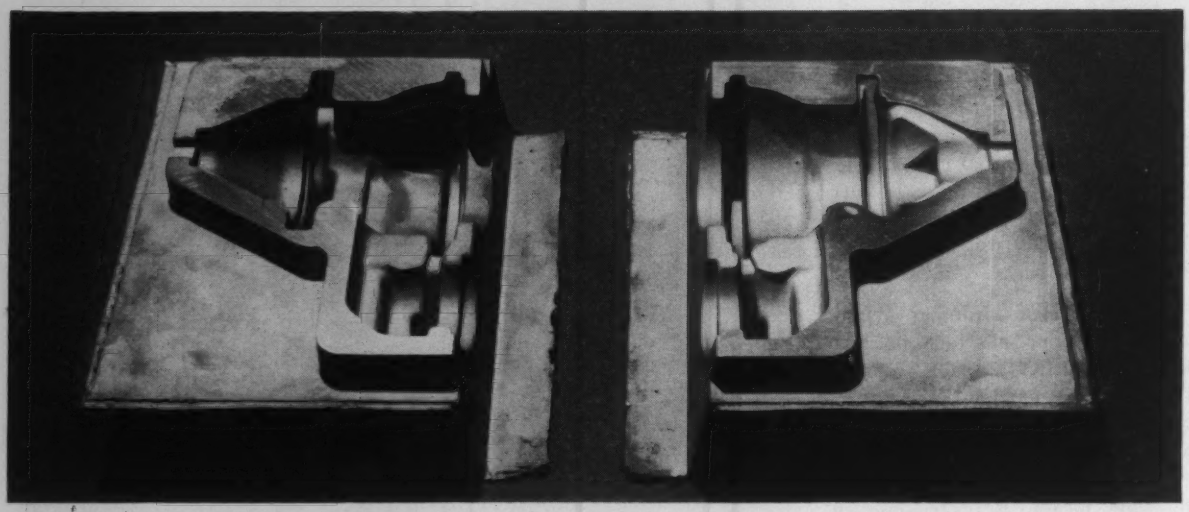
Into the Chamber—The negative mold is now ready for the deposi-

TIGHT FIT: An epoxy filler between the shell and the casting insures a tight fit. The holes provide a mechanical bond, too.

Start to Finish in Three Steps



EASY METHOD: The first step in the process prepares a special negative of the master. Negative is then nickel coated in deposition chamber. On removal, a positive pure nickel shell is produced.



CASE IN POINT: Beginning with one wooden male master model, the carbonyl process produced an exact duplicate in little time. Part is a permanent mold for an aluminum fuel pump casting.

tion chamber. And the mold's inner or mold surface faces up. At this point in the process, the mold consists merely of the sprayed eutectic metal. As this mold enters the chamber, other molds may also enter, regardless of shape.

All of the atmosphere within the chamber is then removed and replaced with inert carbon dioxide. As soon as the molds inside the chamber is then removed and re- 325° and 340°F, nickel carbonyl gas is introduced.

Whenever the vapor of nickel carbonyl is raised above 280°F, it decomposes into free nickel and carbon monoxide. Since the temperature of the "eutectic" molds in the chamber is well over this critical point, this reaction now takes place.

Nickel Released — The original nickel in the gas is deposited molecularly on the heated surface of the molds. Deposition rate is constant, the thickness of nickel deposition being directly proportional to the time. Thickness of nickel deposited is uniform but may be varied from 0.050 to 0.400 in., depending on the end use.

In the next step the nickel-coated mold is removed from the chamber. After the "eutectic" material is removed, you have a pure nickel shell. In form, it's a positive reproduction of the original model. And it's accurate in every dimension and detail.

Very often, this nickel "positive" goes to the customer in the form of a hollow shell. Sometimes, however, it's filled with epoxy resin in which iron or aluminum powder or fibers have been mixed. A steel backing plate is added for mounting fixtures or lifting bolts.

Basic Point—Two of the terms used in the process should be defined. One is carbonyl nickel and the other is nickel carbonyl. The latter, nickel carbonyl, is a liquid that resembles ether both in appearance and in the fact that it's highly volatile. It vaporizes at room temperature and has a boiling point of 111°F, at which point it converts to gas.

Carbonyl nickel is the name applied to the nickel that is produced by the decomposition of nickel-carbonyl gas.

Suppose a customer sends in a "male" mold and requires a "female" counterpart. In such an instance, another step must be added to the sequence. Rather than spray the "male" mold with the eutectic compound, an epoxy-plastic model of the original is made and treated as before.

Capacity—The Budd Co.'s new facility in Conshohocken has two plating chambers. Combined capacity of these chambers is 14,000 plan inches per week.

Carbonyl molds cost about the same as machined patterns. But the real savings (and there are many) come from other areas. For instance, there is a great savings in time alone between the design-freezing stage and actual production of foundry equipment.

Since carbonyl nickel products have such excellent resistance to abrasion and wear in both sand-casting and forming-press operations, they last that much longer.

End-Product Uses

Water pump housings
Transmission housings
Cylinder heads
Exhaust manifolds
Automatic choke housings
Wheel hubs, etc.

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Shake Method Tests Pipe

Induced Vibrations Give Fast Fatigue Life Data

Before installing, it pays to know how long a pipe will last.

A technique for vibrating pipes till failure gives the answer in a matter of minutes.

■ Resonant-bending techniques reduce to minutes the time required to find out the probable years of service in the life of metal pipe. So reports the Tube Turns Div., Chemetron Corp., Louisville, Ky., maker of welded fittings and other piping components.

Lengths of pipe, set to vibrating, literally shake themselves until they crack from fatigue.

J. D. Mattimore, Tube Turns vice president for product engineering and research, gives an example. Carbon steel pipe fittings, with ½-in. wall thickness, can be vibrated to fatigue failure in less than ½ hour.

Suspends Test Pipe—Here is how testing is set up at Tube Turns' product engineering and research labs. Steel pipe, about 10 ft long, hangs freely from an overhanging steel beam. Points of suspension match the calculated node points.

Under one of the points of suspension, unbalanced weights, geared to an electric motor, spin at a preset rpm. They set up forced vibrations that induce a sympathetic vibration or "resonance" in the test pipe.

Locks-In and Vibrates—Soon the test piece "locks-in" on its natural harmonic frequency and vibrates freely. Then the amplitude of vibration is increased by stepping up the motor output. The amount of amplitude of the pipe, obtained from strain gages, is reproduced on an oscilloscope.

It can also be noted by visual deflection cards mounted on the pipe. The vibration rate is determined when the action of a stroboscopic light "stops" the visual cards.

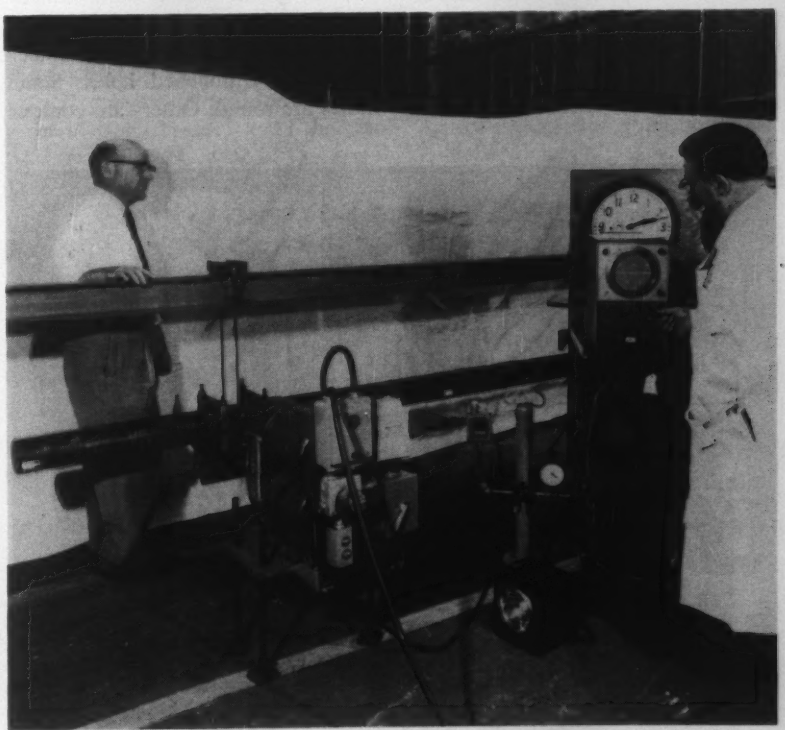
Stops the Motion—Ends of the pipe are sealed; the pipe is put under 10 psi air pressure during testing. Start of a fatigue crack through the pipe wall permits air leakage. A drop of 1 psi controls an automatic switch that cuts off the drive motor. A timing device permits close measurement of the number of cycles to failure.

Without the switch, the pipe can vibrate freely in its locked-in frequency until the crack becomes large enough to change the natural resonance frequency of the test piece.

The pipe would then be reduced to harmless non-synchronous shaking in place of its self-destructive natural harmonic vibration.

For New Alloys—A future use for resonance bending may be the rapid determination of the fatigue life of new alloys developed for piping needs.

According to Mr. Mattimore, the new method is five to six times as fast as present methods for cyclic bending of steel pipe. He points up its low cost from a standpoint of power needs, manpower, equipment investment, and maintenance.



INDUCES VIBRATION: Resonance bending compresses years of fatigue into minutes. Pressure inside pipe decreases when fatigue crack occurs, stops experiment and permits close measurement of number of cycles.

Template-Guided Unit Punches Complex Sheet Metal Parts

Using a copying stylus, an operator follows a color-coded template pattern.

By remote control, a punching device reproduces the pattern in a sheet metal blank.

■ Keeping production efficiency high is a major problem at most metalworking plants. This is especially true when a company specializes in many products. Diversified work requires constant study and analysis to keep costs in line and products competitive in price and quality.

No one is more aware of this problem than The Robert Mitchell Co., Ltd. of Montreal. Composed of a parent company and several subsidiaries—all at one location—the organization produces both factory and foundry products.

Begin Diversification—Originally, the company specialized in railway supply equipment. Diversification was undertaken after World War II to offset a decreased volume in the railway field.

In the general factory division, one of the most recent activities centers around precision sheet metal work for industrial electronics, radar, radio and television.

Soon after this work was started, it became apparent that costs were too high and production methods too slow. Therefore, the company began a complete equipment analysis and time study program.

Inherent in the program are studies of the basic construction of various parts. These parts consist mainly of chassis, consoles and cabinets. All require a great number of precisely punched holes. Some holes are round: Others are contour shaped. Most appear in complex patterns.

Start New Program—An efficient sequence of operations had to be set up. And, it had to apply equally from job to job while holding close tolerances.

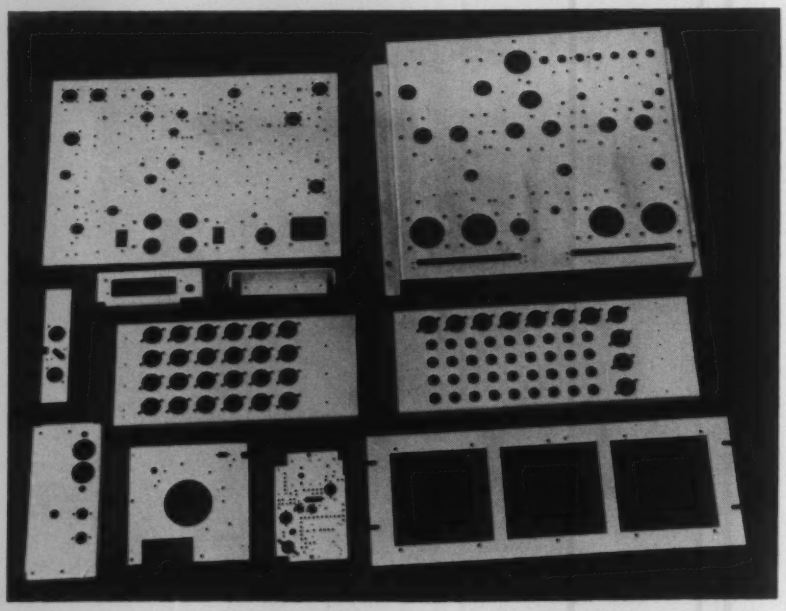
The first purchase under the new program was a fabricator-duplicator machine, made by Wales-Strippit, Inc., Akron, N. Y. This machine punches, notches and nibbles sheet metal—up to ¼-in. mild steel.

The fabricator unit features a tool holder that consists of a punch-holder arm and a die-holder plate. These parts form a single, permanently aligned assembly. Self-stripping punches and die buttons are stored in file drawers that are part of the unit's cabinet.

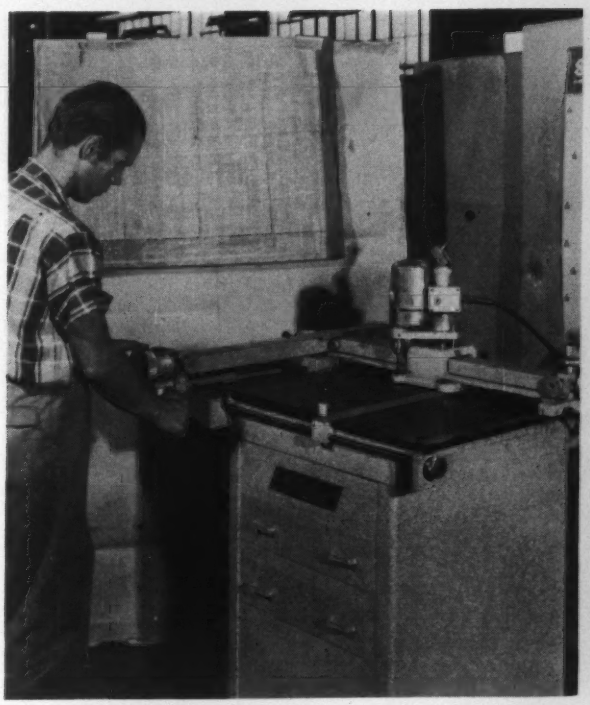
Quick Changeover — To change from one size punch and die to another takes about 20 seconds. Replacing the tool holder with a filler plate, an operator mounts a notching assembly in the machine. A toggle switch provides the changeover from single hole punching to 165 strokes-per-minute nibbling for straight line work, circular or rectangular cutouts.

The duplicator unit has a pantograph-type stylus that's also an accessory to the fabricator unit. Using the copying stylus, the operator follows a template hole pattern. By remote control, the fabricator's punching mechanism reproduces the pattern in a workpiece.

Template holes match the size of the stylus. These holes center on the exact locations where holes are needed in the workpiece. Each template hole corresponds to a specific hole in the finished workpiece. A separate color is used for each hole size.



PUNCHING PROBLEMS: Production punching handles a multifarious line of complicated parts for industrial and defense electronic equipment.



CUTS ENGINEERING: Working directly from customer's part drawing, operator makes a template.

PRODUCTION RUN: Punching of blank takes place as operator moves stylus from hole to hole.

Colors Provide Key—The operator clamps a color-coded template to the duplicator's table. He lines up a blank—that will become a finished chassis—under the fabricator's punch.

As he moves the stylus from hole to hole over the template, the workpiece moves in a corresponding motion. When the operator places the stylus in a template pilot hole, a micro-switch trips. This triggers a control and punches the hole in the part.

After he starts, the operator follows one color line to punch all holes of a given size. Then, he puts the next size punch and die in the machine and follows a second color route around the template with the stylus.

He continues until all holes are punched. Accuracy of the punched hole locations in the workpiece is within 0.002 in. of the template.

Evaluate Template Machine — Further studies of the problem resulted in the purchase of a Strippit Flex-O-Drill template drilling and layout machine. This table-top unit drills, reams, scribes and center punches.

It consists of two moving members, the bridge and the drill carriage. They can be accurately positioned, then locked into place during the drilling operation.

The bridge slides forward and back over the work table. It represents the vertical dimensions of a drawing. The drill carriage slides along the bridge and represents the horizontal dimensions.

Fast Traverse — Both move on ground, plated ways and are positioned by precision-ground lead screws. Screw followers allow the bridge and drill carriage to disengage from the lead screws. This permits fast traverse in either direction and minimizes wear.

Adjustable steel tapes—reading to 1/10 in. — determine coarse readings of the hole-to-hole dimensions. Final adjustments are set with micrometer gages. These gages read to 0.001 in.

The machine handles stock up to ¼-in. thick, 24-in. wide, and in any length. Overall accuracy is within ±0.002 in.

In setting up a job, the operator uses any starting point on the workpiece to set his tapes and micrometer gages to zero. To position the drill head for each hole location, he moves the bridge and/or drill carriage with the lead screws disengaged.

Templates Push Production — After setting the coarse readings, he engages the lead screws with the micrometer gages. Once the final dimensions are set, locks prevent the lead screws from turning.

Exact location of each hole can be established by using the original starting point as a base—or by rezeroing on a preceding hole. After the drill is set, a bushing near the work surface guides the drill and feeds it into the stock.

A trained operator makes a template right from the customer's part drawing. This eliminates all engineering time formerly required to make template prints.

CHAMFERING: Crack in flywheel housing is chamfered out to prevent buildup of stress concentrations.

Three-Step Welding Method Speeds Repairs on Castings

It costs much less to repair weld a cracked casting than it does to buy a new one.

Here's a new electrode that puts castings back in service with less downtime than usual.

■ A better solution to the problem of repair welding cracked castings is now undergoing widespread field tests. It's a three-step method that cuts 90 pct of the time spent in welding cast iron by certain conventional techniques.

After each welding pass is deposited, it's immediately water quenched. This eliminates the time gap allotted for slow cools between passes. Also, special preparation of the weld groove prevents the weld from distorting.

Castings can be repaired by following a simple procedure built around three electrodes. Final welding is done with QuenchTrode 24, a new electrode designed by Eutectic Welding Alloys Corp., Flushing, N. Y.

Partners — Two other Eutectic electrodes, ChamferTrode and EutecTrode 27, also fit into the scheme. The former performs the chamfering step. The latter takes care of sealing in the contaminants.

Preheating is no longer needed, using the new "QuenchWeld" method. Peening can be bypassed, too, whenever the passes are quenched with water.

The procedure is as follows. The area to be welded is veed out with the chamfering electrode. Grooves are then made to break up stress concentrations around the vee. In the next step, the anti-stress grooves are filled in with the sealing electrode. The entire area to be welded is also covered with a thin deposit from the same electrode.

Proper Surface—The purpose of the second step is to prepare the surface for a strong bond between the cast iron and the final deposits. It also prevents grease and chemicals from affecting the soundness of the end weld structure.

Then the machinable electrode, QuenchTrode 24, is laid down in a series of passes. Since each pass can

be quenched as soon as it's finished, the part goes back into service that much sooner.

Frequently, many castings have to be scrapped because of the distortion and cracking that result from high welding temperatures. But this new method is well suited for thin sections and heavy castings. It will also take care of filling blowholes or machining errors and of building up worn or damaged surfaces.

As a joining technique, the method can weld cast iron to cast iron or cast iron to steel. You can use ac or dc in any position.

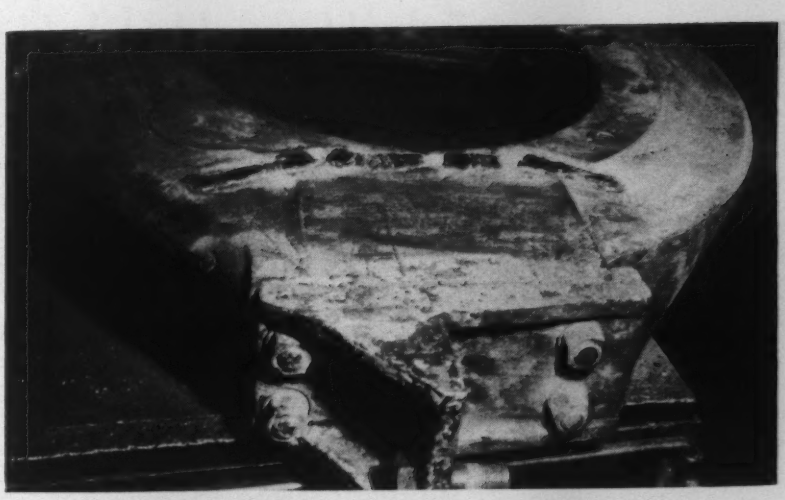
Back Step—A vital part of the welding sequence is in the third step. Here, the job should be done using back-step welding techniques. Beads should vary between 1 and 4 in., depending on thickness. As far as quenching is concerned, a wet rag will do.

What are the reports from the field? A costly circulating pump at Foster Wheeler's North Omaha Station developed a crack in its lower case. Freezing of entrained water caused the crack during outdoor storage.

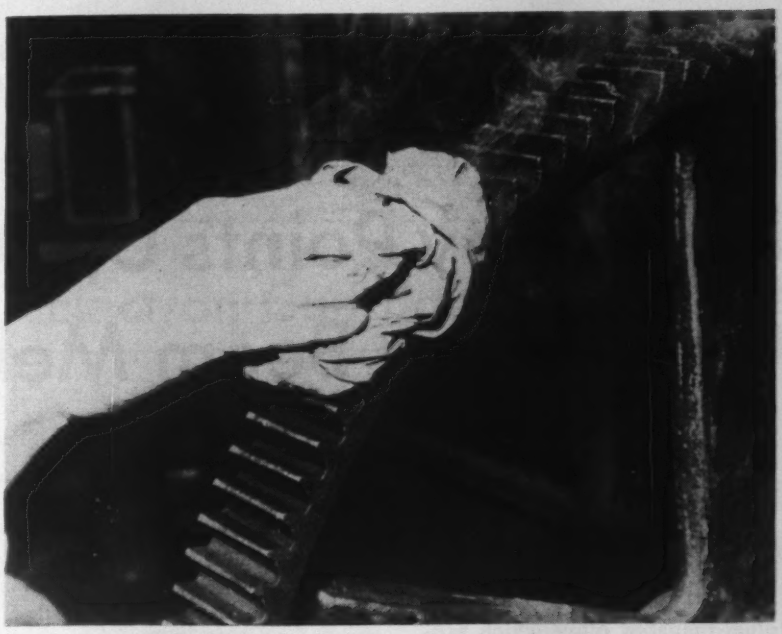
Of course, the company wanted its casting repaired. And further cracking and distortion had to be avoided. The new Eutectic repair method was finally employed.

Quick Work — Using a ⅛-in. diam ChamferTrode electrode, the 43-in. long crack was veed out. Sealing and welding were also done with ⅛-in. diam electrodes. To prevent cracking during welding, two ½-in. holes were drilled at each end of the crack. The pump has since been reassembled. The degree of distortion is within safe limits.

A shop in North Dakota repaired an oil pan and a flywheel housing from an earthmoving machine in 1½ to 2 hours. Cost of electrodes: $5. Prior to using the three-step method, seven hours of bronze welding time had been wasted on the oil pan alone.

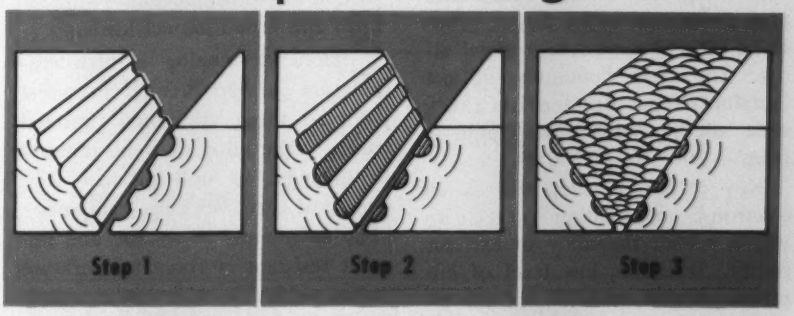


FAST REPAIR: Quenching between passes cuts welding time.



WATER QUENCH: Fast quenching technique saves hours in repair time.

How to Repair Casting Defects



THREE STEPS: First, vee out the cracked area and chamfer stress-relieving grooves. Next step, seal in contaminants; finally weld.

WATCHES METAL REFINING: Melt can be constantly seen as electron-beam unit produces high-purity ingots.

New Alloy Points Up Advantages Of Electron Beam Melting

By **D. F. Mastick**—General Manager, Stauffer-Temescal Co., Richmond, Calif.

Electron-beam melting refines metals to high purity levels.

Result: development of tantalum-tungsten alloy which features 45,000 psi tensile strength at 2200°F.

■ Melting and casting techniques play a vital role in the unique properties of a new refractory metal alloy. The alloy, containing 90 pct tantalum-10 pct tungsten, has a very wide useful temperature range—from —200° to +5200°F.

Key to the development is an electron-beam melting process which refines the alloy to extreme purity. It is this low level of impurities which accounts for the alloy's high ductility — even at —200°F.

Withstands Brutal Loads — Developed by Stauffer-Temescal Co., Richmond, Calif., the 90 Ta-10 W alloy meets the severe metal demands for rocket engine parts such as nozzle and flame barriers. Another use is for leading edges of ultrahigh-speed aircraft. These parts must withstand high temperatures and brutal impact loads.

Before developing a high-temperature alloy, Stauffer-Temescal adopted these additional "ground rules." The alloy must be reduced from ingot to mill product with standard steel-working equipment. The alloy must be ductile and impact resistant at room temperature when welded or otherwise recrystallized.

The approach taken was to start with a very ductile refractory material—tantalum. Next consideration was to alloy with a metal that has high temperature strength. Tungsten was the choice despite its brittleness.

Triple-Melt Cycle—Making the ingot involves a triple-melt cycle. A mixture of tantalum and tungsten powders, in the form of cold-pressed bars, is first melted into a crude, 4 in. diam semi-purified ingot.

The next step calls for remelting into a high-purity ingot of the same diameter. Last, it is remelted into a 5 in. diam ingot with smooth side walls.

Here's how the electron-beam melting unit works. As shown in

the linecut, the charge enters through one of several entrance locks, each designed to handle a certain type of stock. It then passes through the upper gun where it fuses and drips into a water-cooled mold.

Pool of Metal—The lower gun, concentric with the ingot mold, maintains a molten pool into which the feedstock drips.

As the material solidifies in the open-bottomed mold, an ingot-puller extracts it at a rate which keeps a constant level in the pool.

If the feedstock is pre-melted ingot stock, two electron guns are not needed. A single gun with proper focussing shields can be made to divide the beam for ingot melting as well as keeping the molten pool.

Grinds Out Defects — Before forging, the ingot is conditioned by spot grinding to remove any cold shuts in the surface. Very often some ingots need no grinding.

The ingot can be forged to bar or plate in air at 2200°F. The stock is then machined or ground to remove 1/16-⅛ in. of metal from each surface. This removes both the oxide-contaminated metal and the flaws produced by forging.

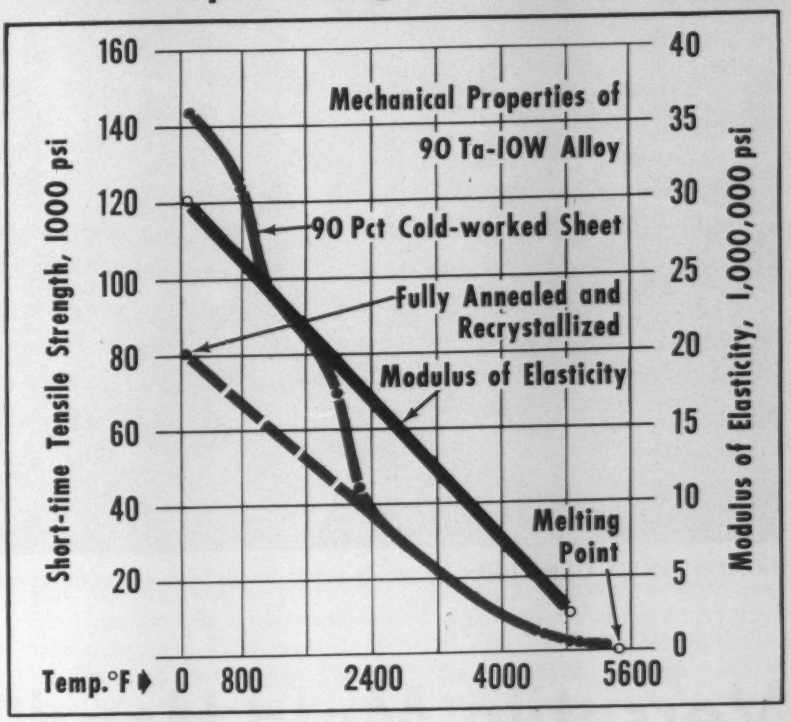
Annealing at 2200°-2400°F in either air or vacuum (depending on the amount of reduction desired) restores ductility for further cold working.

After working of the conditioned bar or plate it takes only occasional surface grinding, typical of standard metal-working operations.

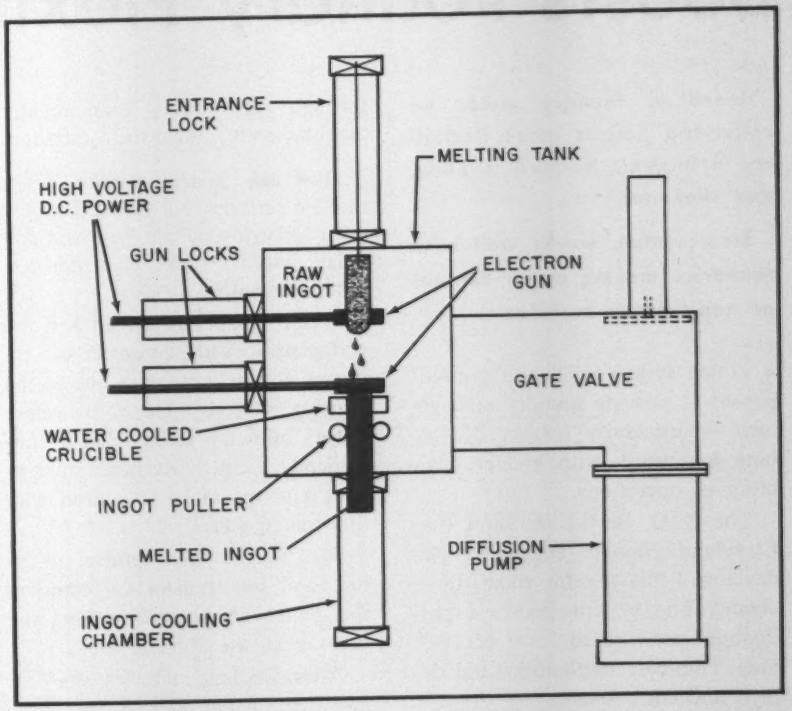
Alloy Is Weldable — Another noteworthy aspect is that the alloy can be welded by normal high-quality inert arc or electron beam techniques. Welds are ductile and impact resistant at room temperature.

Thus, 90 Ta-10 W appears to be particularly useful when welded structures are needed for use above 2500°F, and subject to intermittent impact and tensile loads at ambient temperatures.

Holds Up at High Temperatures



Electron Gun Bombards Metal



HOW FURNACE WORKS: Charged metal, melted under vacuum by electron guns, drips into mold. Extraction is by ingot puller at preset rate.

LOADS ONTO CAR: Pallet of newly-made molds slides out onto transfer car for move to pouring station.

Versatile Mold-Handling System Boosts Foundry Flexibility

Handling foundry molds on roller-top pallets gives flexibility in loading, pouring, cooling, and shakeout.

New system works well with foundries making either ferrous or non-ferrous castings.

■ A new system for handling molds is said to provide foundry management—particularly owners of jobbing foundries—with greater flexibility of operations.

The C. O. Bartlett & Snow Co., Cleveland, foundry engineers, who developed this system, makes these claims. The systems increase production per square foot of floor area, eliminate bottlenecks and delays, and cut costs.

They also permit different types and sizes of molds to be handled through the foundry economically and efficiently, and at the same time.

How the System Works—Each molder sets out his finished molds on a roller-top pallet. To avoid any delay, another pallet is in position ready to load.

When a pallet is loaded and the end plate locked, a transfer car removes and delivers it to one of the pouring stations. There, a weight lowers onto the mold from a conveniently located overhead storage-bar. And the mold is poured with the desired metal.

The weight then returns to its bar; and the transfer car removes the pallet of poured molds, and takes it to the cooling zone.

After cooling, the transfer car moves the pallet over to one of the shakeout sections. After shakeout, it returns the pallet with bottom boards and bands—or flasks—to the molder again.

Keep Molds Separate—Efficiency is said to be very high. There is no waiting for set-out space. Molds of different sizes, and both snap and tight flasks, can be handled economically in the same foundry—and always kept separate.

Slow jobs do not hold up the faster jobs. Weight and jacket handling are greatly simplified.

Handling similar molds together as a group permits different groups of molds to be poured with metal of varying analyses, or even entirely different metals.

Efficient Location—Molding, pouring, cooling, and shakeout are centralized, thus minimizing equipment needs. Melting equipment can be placed close to the pouring zone. Ventilation is simplified. Few pits are required.

POURS WITH DESIRED METAL: A weight lowers onto mold from overhead bar before molds are poured.

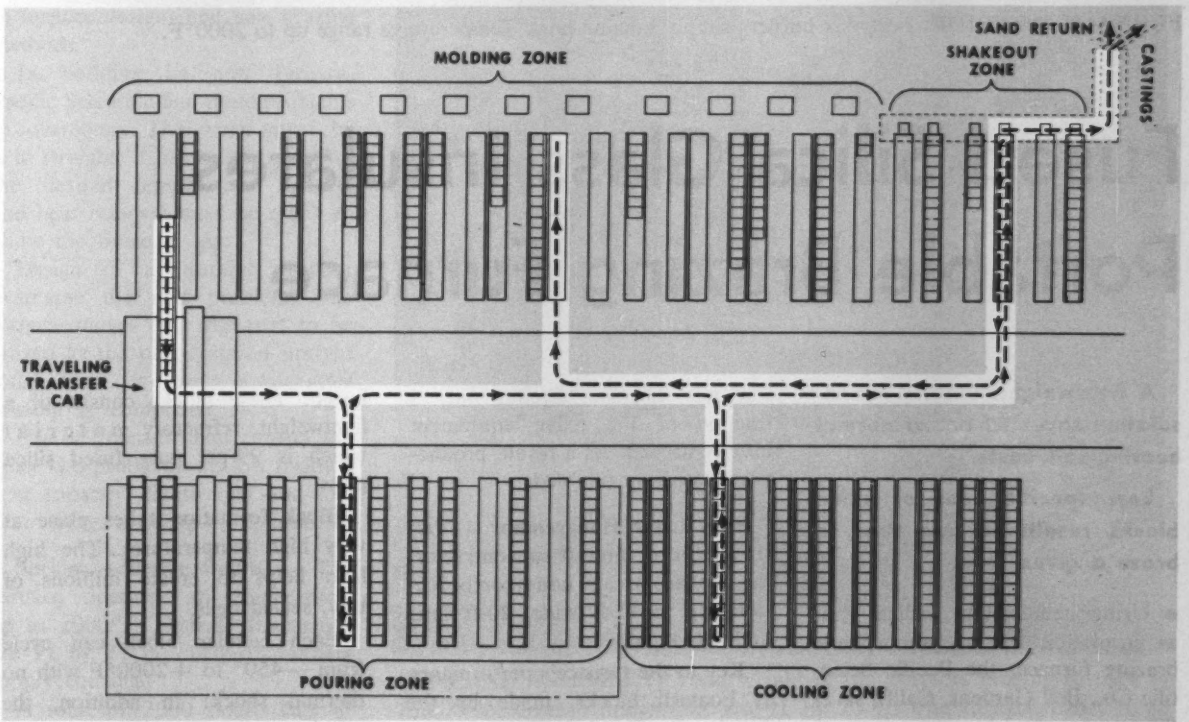
HANDLES DIFFERENT MOLD TYPES: As molds are prepared, they are set out on roller-top pallet.

Cooling time is long or short, depending upon the size and type of casting. There is no interference with the cooling cycle, or production, or other groups of castings.

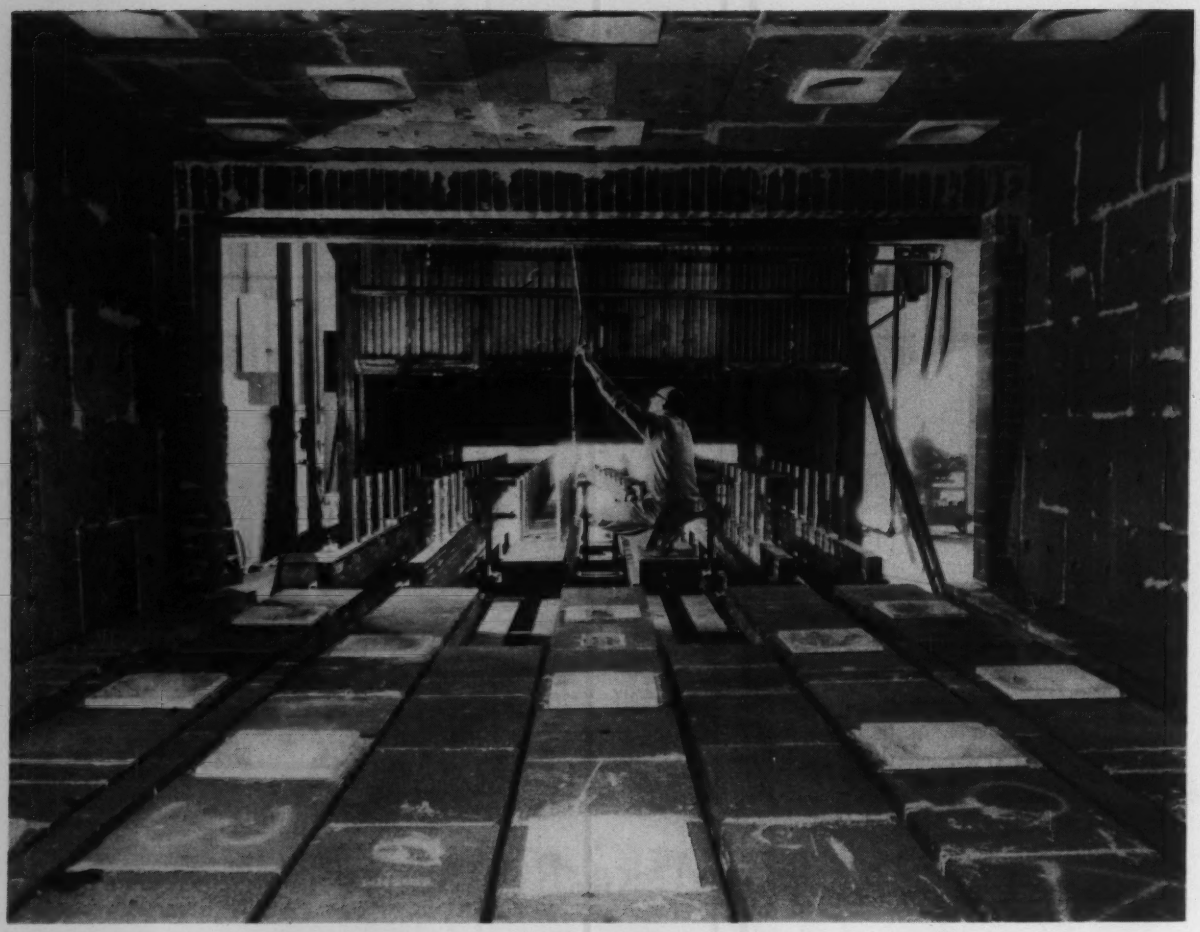
In addition to this handling system, Bartlett-Snow has two other new systems. One is of continuous loop design with molds carried side by side in each car. It provides almost twice the cooling time of a conventional conveyor of same length, but carrying a single line.

The other is of the indexing type. That is, the molds are loaded onto the conveyor, poured, and the molds removed, while the conveyor is stationary.

How Molds Make Round Trip in Foundry



PLAN VIEW: Dotted lines point out path of mold-group as it makes round trip from molding to shakeout.



FURNACE INTERIOR: Forty-six burners supply brazing heat. Temperatures range up to 2000°F.

Fused Silica Glass Insulates Portable Brazing Furnace

A lightweight, easy-to-cut insulation saves 80 pct of normal heating-unit costs.

Low specific heat of silica blocks results in less time to braze a given load.

■ Using cellular-type, silica glass as insulation for an atmospheric brazing furnace, the Pacific Scientific Co., Bell Gardens, Calif., saves 80 pct of normal heating-unit costs. The new furnace requires only a fraction of the firing equipment usually needed. As a result, production costs have tumbled.

Suits Large Honeycombs — Designed for an aircraft subcontractor, the furnace treats honeycomb sections up to 12-ft wide, 20-ft long and 4-ft high.

Key to the furnace's performance is Foamsil blocks, made by the Pittsburgh Corning Corp., Pittsburgh. These blocks consist of a lightweight, refractory material which is 99-pct pure fused silica glass.

Block formation takes place at very high temperatures. The high heat helps to create millions of tiny, sealed cells.

Each cellular block can cycle from —450° to +2000°F with no thermal shock. In addition, the blocks—weighing only 13 lb per cu

ft— withstand a compressive load of 200 psi.

However, even more important is the block's low specific heat— only 0.277 at 1200°F.

Requires Less Heat—Mr. H. H. Mescher, director of research and development at Pacific Scientific, states: "Foamsil requires five times less heat to bring a given load up to temperature."

According to Mr. Mescher, the growth of the aircraft and electronics industries has brought with it many problems. These problems center on the manufacture of complex parts. To make these parts smaller and more heat resistant is the designer's goal.

This, in turn, calls for new concepts in furnace design. Furnace makers shoot for faster handling methods, automatic controls and consistently even heats.

Demand Brings Changes — As demand brings special stainless steels and rare alloys out of research stages and into actual production, the art of brazing becomes more and more complex. Use of the rare alloys brings about changes in furnace designs and new brazing methods.

In building its new furnace, Pacific Scientific had three problems to overcome. The work must be held straight; it has to be heated to the desired temperature rapidly; and heat removal must be quick to allow the braze to set.

Design of a portable furnace overcame the first problem. The furnace moves over the part to be brazed as the part rests on upright rods. Then, it backs away after brazing is completed.

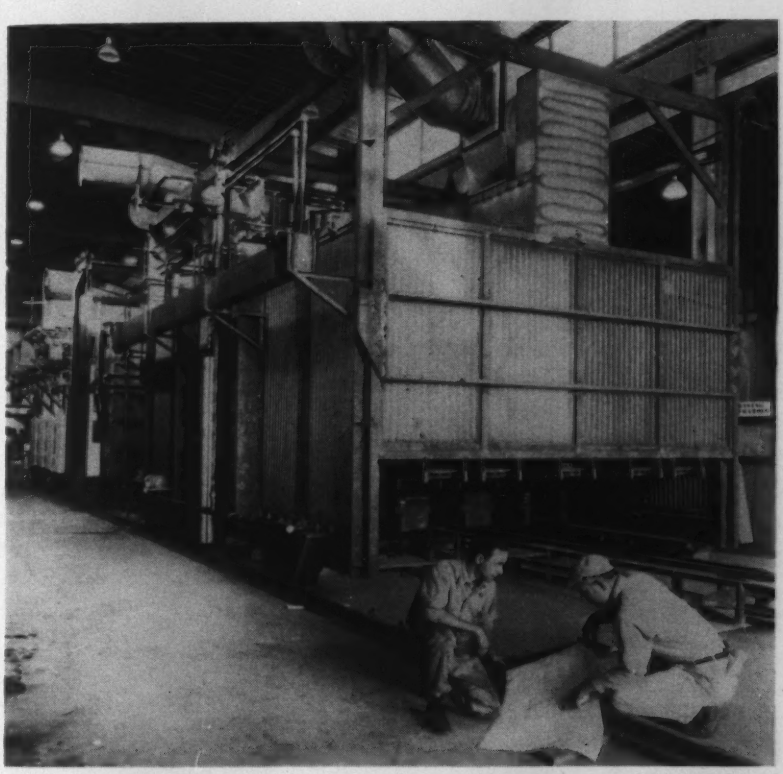
Use of Foamsil takes care of the other two problems. Its low residual heat capacity, lightweight and low heat-storage capacity fill both needs.

Special Adhesive Bonds — The furnace operates at temperatures up to 2000°F. Overall dimensions are 91 by 21 ft. Forty-six burners supply the heat.

A total of 3000 board feet of silica block is installed in the furnace. This includes double rows of 17- by 22-in. blocks. One layer is 2-in. thick; the other is 3-in. thick. Special Foamsil cement acts as the adhesive.

Total weight of the furnace is 75,000 lb. The hearth weighs 25,000 lb. Total cost is $163,000. Of this figure, $20,000 is for heating equipment. If the silica blocks hadn't been used, the heating unit alone would have cost $100,000.

FAST MAKE-UP: Operator uses saw to cut cellular-type insulation.



GENERAL ASSEMBLY: Total weight of the portable brazing furnace is 75,000 lb. Overall dimensions are 91 by 21 ft. The furnace treats large honeycomb sections up to 12-ft wide, 20-ft long and 4-ft high.

Build Your Own Carbide Tools

Powder metallurgy embeds tiny crystals of titanium carbide in a matrix of stainless steel.

Regular shop tools machine these do-it-yourself carbides.

▪ Carbide parts and tools to withstand high temperatures or corrosive media can now be made in the machine shop. Powder metallurgy methods embed tiny crystals of titanium carbide in a softer matrix of stainless steel to form a stainless-bonded carbide. Conventional tools machine this new material.

The composite material retains the machinability of the stainless steel. It also exhibits the same heat and corrosion resistance as stainless. In addition to these features, it provides the ultra-hardness of titanium carbide.

Thus, design and tool engineers now have at their disposal a versatile and economical stock material. From this stock, they can fashion many items that require high heat, wear, or corrosion resistance.

Two Grades Available — Stainless-bonded carbides, made by the Sintercast Div., Chromalloy Corp., Yonkers, N. Y., come in two grades. Difference between the grades lies in their machinability. One has a hardness of about Rc 45; the other Rc 55. Any single-point or multiple-point cutting tool machines the softer of the two (Ferro-Tic S-45).

Ferro-Tic S-55, the harder one, is suitable only for the basic operations, such as sawing, turning and drilling. Milling or tapping of the harder stock isn't recommended. Both grades can be ground, and may be joined to other metals by welding or brazing.

Typical uses for these do-it-yourself carbides include: forming tools; high-temperature bearings; nozzles; homogenizing gages; seals for pumps; valves or valve seats; and knives and choppers requiring a high degree of cleanliness and corrosion resistance.

Meet Rough Use—At high temperatures and high pressures, the bonded carbides are stable. In tests, Ferro-Tic S-55 punches hot-coined nickel and cobalt alloy blanks at temperatures of 1600°-1650°F and pressures up to 100,000 psi.

After repeated pressings, these punches show no flaws or cracks, nor have their dimensions changed.

Complex parts are made from the composite blanks, quickly and easily, without resorting to cast or formed shapes. Costly diamond grinding is avoided. After models have been tested, and if quantity permits, shaped parts can be formed by powder metallurgy methods.

Regular Stock Sizes—Stainless-carbide blanks are available in rectangular forms up to 1 x 2 x 7 in. They may be ordered from stock as round bars up to 2-in. OD and 6-in. long, or 6-in. OD up to 2-in. long. Other sizes and shapes are made to order.

Sintercast Div. also produces Ferro-Tic C, a machinable carbide with low-alloy tool steel as the matrix. This type is fully machinable and it can be heat-treated to varied degrees of hardness.

Due to negligible warpage in heat-treating, the low-alloy blanks can be quickly machined to finished sizes. No final grind is required. The steel-cemented carbide is good for many tools and dies but it doesn't have the heat and corrosion resistance of the stainless-bonded carbides.

EASILY MILLED: Operator mills the stainless-bonded carbide with ease.

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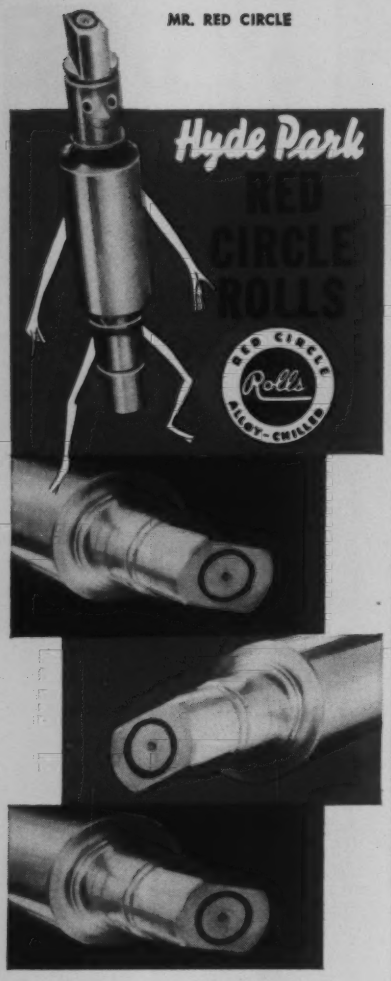

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Rolls
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New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 111.

Drilling Machine

Fully describing a turret drilling and tapping machine, a short bulletin includes: complete specifications, accessory equipment, case histories, and a graphic illustration comparing the great cost advantages of the machine over other competitive equipment. (Burgmaster Corp.)

For free copy circle No. 1 on postcard p. 111

Ceramic Fiber

An eight-page multi-colored brochure lists the properties, available forms and current uses of a high-temperature ceramic fiber. Typical uses include: linings for domestic oil burners, induction-furnace linings, brazing metallic honeycomb sandwich panels in airframe industries, general furnace insulation and other critical applications in missile and space-vehicle programs. (The Carborundum Co.)

For free copy circle No. 2 on postcard p. 111

Control Mechanisms

Electrohydraulic - control information is supplied in a 20-page bulletin. The bulletin provides engineers with a current summary of the basic principles and potential applications of electrohydraulic servocontrol mechanisms. Features of the bulletin are: description, types and applications of servovalves, and study of typical case histories. Numerous drawings and diagrams illustrate the text and aid in the discussion of various types of units. Also included is a description of a complete line of control components. (MOOG Servocontrols, Inc.)

For free copy circle No. 3 on postcard p. 111

Abrasive Finishing

Step by step technical data tell how to produce such finishes as dull matte, dull satin, Butler, semi-mirror and mirror on solid silver and silver alloys. Data also include recommendations for compounds, wheels, wheel speeds, and buff lubrication. (The Lea Mfg. Co.)

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Sales Agents

Presented in a brief brochure on industrial sales agents, is data on how manufacturers may improve sales representation and increase sales through the use of commission sales agents. (Albee-Campbell, Inc.)

For free copy circle No. 5 on postcard p. 111

Metal Containers

Presenting excerpts from a wide production program, a 20-page brochure shows a complete line of machines for the manufacture of metal containers. (L. Schuler AG.)

For free copy circle No. 6 on postcard p. 111

Dust Collectors

Describing a line of dust collectors, a 16-page, illustrated, two-color brochure lists typical industry applications. It itemizes those for

power plants, steel production, chemical and petroleum processing, and general manufacturing. A cutaway photograph explains operating characteristics, and construction features are described and illustrated. Also shown are assembly arrangements. (American Standard Industrial Div.)

For free copy circle No. 7 on postcard p. 111

Coil Handling

Fully illustrated and detailed, a catalog features dimensions, capacities, specifications, and prices on eight automatic and motor-driven stock reels for coil-handling applications. (Durant Tool Co.)

For free copy circle No. 8 on postcard p. 111

Ventilation Products

Enabling purchasers to lay out a completely corrosion-resistant system for handling corrosive fumes, a 17-page bulletin describes a line of ventilation products. These products include rigid-vinyl and reinforced - plastic collecting hoods, ducts and stacks, elbows and other fittings. The bulletin also contains: listing of standard sizes, specifications, and chemical-resistance data. (Heil Process Equipment Corp.)

For free copy circle No. 9 on postcard p. 111

Free-Piston Pump

The subject matter of a short bulletin concerns itself with an air-operated, free-piston pump, which pumps anything that flows. The illustrated brochure contains pump information on use, materials, operations, capacity, maintenance, service life, dimensions, weight, and engineering service. The bulletin also reports on a well attachment. (The Crossley Machine Co.)

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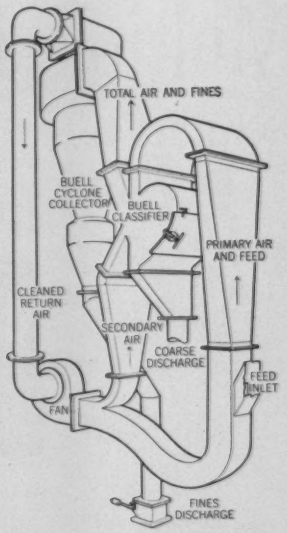
Industrial Writing

For the benefit of companies with employees who do large amounts of writing, a new booklet tells how to improve business and industrial writing. It explains how American industry wastes billions yearly through poor writing. The booklet shows how business executives, re-

HOW BUELL CLASSIFIERS HELP YOU IMPROVE YOUR PRODUCT

Here's how a Buell Classification System solved a specific problem. A sodium phosphate manufacturer had to meet stricter customer specifications. No more than 15% of the material could be below 100 mesh and no more than 1% below 270 mesh. But the apparent density could not be less than 0.98. If the classifier removed too much of the intermediate size particles from the finished product, the apparent density requirement could not be met. ■ Laboratory tests proved that the Buell Classifier could easily meet the mesh requirements, and the required apparent density could be maintained if the classification was at 95% overall efficiency. Furthermore, space limitations were overcome by the Buell Classifier's ability to carry material pneumatically, so that no extra, bulky and expensive conveyors were needed. The Buell Classifier simply discharged the coarse sodium phosphate by gravity into one bin and carried the fine material by air to a second bin. ■ Despite rigid particle-size requirements, Buell Air Classifying Systems operate to critical size specification at well over 90% efficiency. High capacities let them keep up with all mills. And with low velocity and no moving parts, wear is almost non-existent. ■ Buell Classifiers today are being used in iron ore beneficiation, removal of minus 10 micron sodium nitrate particles, dedusting of soda ash and the classification of such diverse materials as phosphate rock, silicon carbide, uranium ore and glass beads. Many installations have proved so successful that they have led to repeat orders. Why not send us your specific problem? Write for descriptive literature. ■ The Buell Engineering Co., Inc., 123 William St., N. Y. 38, N. Y. Northern Blower Div., 6404 Barberton Ave., Cleveland, Ohio. (Subsidiary: Ambuco Ltd., London, Eng.) ■ Cyclones • Electric Precipitators • Bag Collectors • Combination Systems • Classifiers



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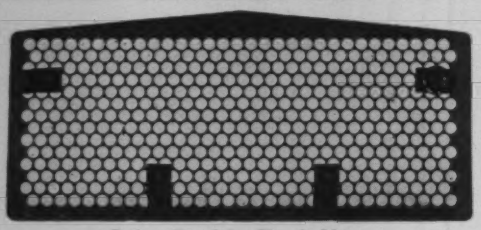
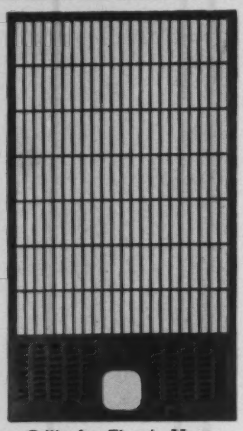


Rodent Guard for Electric Motor



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For nearly half a century we have been furnishing perforated metal sheets, plates and parts to manufacturers of industrial equipment and household appliances, at lower cost than if the work were done in their own shops. No magic — just because we are especially equipped and organized for that type of work.

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Our new 32-page catalog illustrates a great variety of perforated metal patterns and gives complete working data. Also shows many modern applications. Write for Catalog 59. No charge or obligation.

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Manufacturers of DIAMOND Perforated Metal Panels for Modern Acoustical Ceilings.

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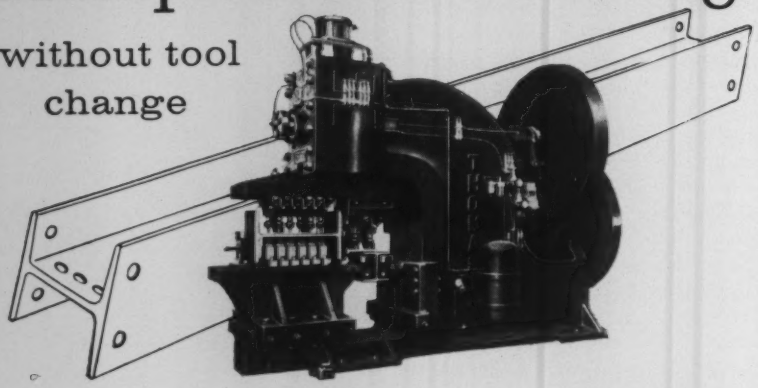

More holes . . . less material handling . . . fewer and easier tool changes! All these profit producers are yours with THOMAS Multiple Beam Punches. Built in four standard sizes, these machines reflect the fifty-year Thomas reputation for modern design, rugged construction and dependable service. And Thomas Spacing Tables may be added at any later date.

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66

FREE LITERATURE

search men, scientists, engineers, etc., waste valuable time and money because they can't express themselves well in writing. The booklet relates how to train employees to write accurately, clearly, and fast. (The Industrial Writing Institute)

For free copy circle No. 11 on postcard p. 111

Dry-Abrasive Cutter

A well-documented four-page folder describes a dry-abrasive cutting machine. The unit offers a fast, economical method of cutting solids, tubing and structurals. These include: cold-rolled steel, alloy steel, stainless steel, cast iron and many nonferrous metals. (American Chain & Cable Co., Inc.)

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Heating Elements

In addition to detailing the reliability features of a new wire-mesh heating element, a 16-page catalog gives complete technical data. This data includes: versatility, physical properties and thermal characteristics. (Electrofilm, Inc.)

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Precision Tools

A 48-page catalog illustrates and describes 88 tools. These include satin-chrome steel tapes, master vernier height gages and calipers, micrometer calipers, inside micrometers, micrometer depth gages and micrometer heads, satin-chrome combination sets, protractors, dividers and trammels, and many other items. (L. S. Starrett Co.)

For free copy circle No. 14 on postcard, p. 111

Analytical Services

Presented in a brochure is a brief pictorial tour of an analyzing laboratory. Covered are the facilities available for analyses services of such materials as: ores and minerals, metals, slags, super alloys, refractories, ferrous and nonferrous alloys. (Spectrochemical Laboratories, Inc.)

For free copy circle No. 15 on postcard p. 111

LEASE...RENT...or BUY

Your Material Handling Equipment

Towmotor Corporation and its subsidiary Gerlinger Carrier Company offer you three simple ways to improve your material handling operations . . . realize immediate savings . . . and accomplish this with little cash outlay.

1. You can put Towmotor-Gerlinger material handling equipment—fork lift trucks and material carriers—to work on a continuous round-the-clock basis through the Lease-A-Truck Plan. No down payment—no working capital tied up—just a small monthly charge.
2. You may also *rent* Towmotor-Gerlinger equipment on a short-term basis—as peak or seasonal demands require. You will start lowering handling costs immediately.
3. You can own new Towmotor-Gerlinger equipment by making reasonable monthly payments through the Towmotor-Gerlinger Time Payment Plan. Low interest rates make it easy.

Complete factory supervised maintenance can be included in any of the above plans.

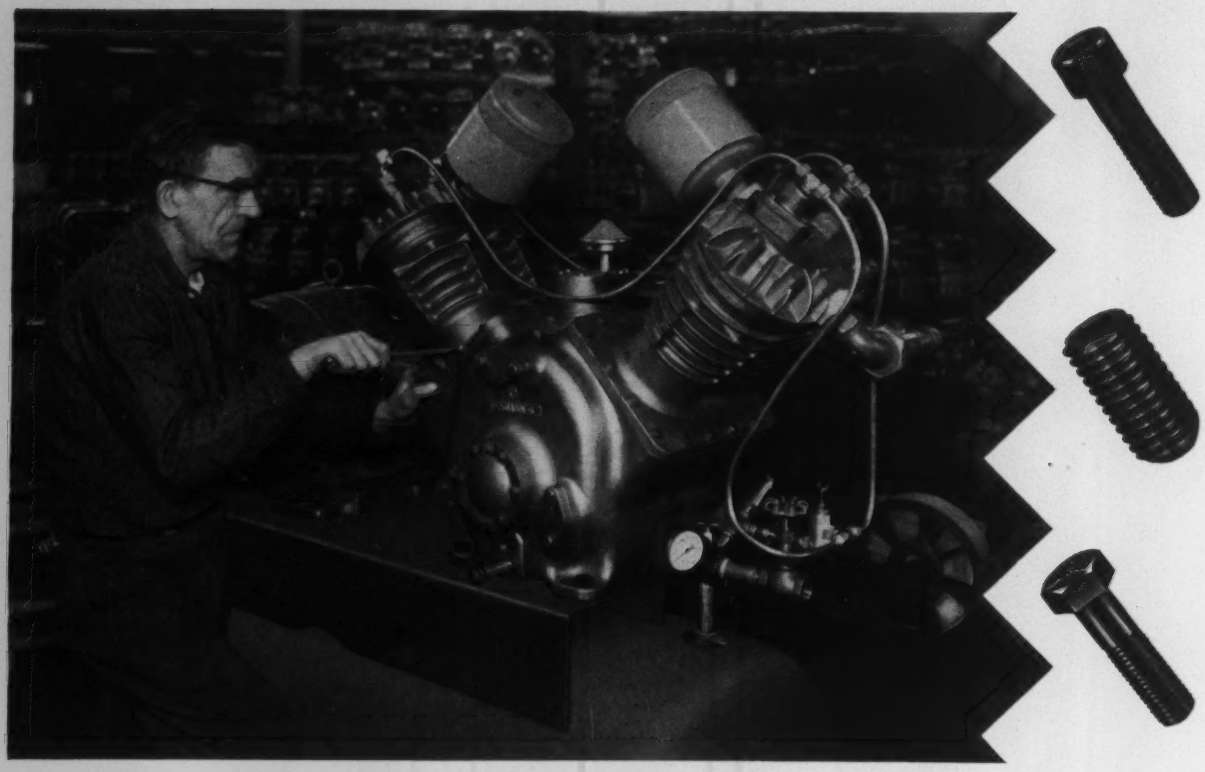
You'll find Towmotor-Gerlinger handling economies consistently pay the small monthly cost many times over. For complete information on any of these profitable, money saving plans, write or contact Towmotor-Gerlinger Rental Division, Towmotor Corporation, Cleveland, Ohio.

TOWMOTOR® THE ONE-MAN GANG -GERLINGER

FORK LIFT TRUCKS, CARRIERS AND TRACTORS SINCE 1919

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

IT PAYS TO STANDARDIZE ON **STANSCREW**



Stanscrew provides faster service, adds safety for BRUNNER SINCE 1906 compressors

The fasteners this man is tightening must be really dependable. Dunham-Bush, therefore, maximizes the safety margin for its Brunner line by standardizing on Stanscrew heat-treated cap screws for all critical applications.

With tremendous production demands on its Hartford plant due to industry's preference for Brunner compressors, Dunham-Bush also demands a supplier who provides quick assistance on all occasions, and moves especially fast in emergencies. Stanscrew meets these requirements because complete stocks are maintained at three conveniently located plants . . . plus a management philosophy which looks on shipments within 24 hours as normal procedure, subject to drastic improvement in emergencies.

Fast delivery and reliable products are but two of many reasons more and more industrial leaders are switching to Stanscrew. A complete selection of over 5,000 different standard fasteners . . . experienced fastener specialists to provide qualified technical assistance . . . these and many other factors underline the advantages of specifying Stanscrew for your fastener requirements.

Why not call your Stanscrew distributor today. He will gladly arrange a prompt visit from the Stanscrew specialist who can often save you money . . . for example, by substituting a standard fastener for a costly special.

STANSCREW FASTENERS

CHICAGO | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
HMS | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
WESTERN | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

STANDARD SCREW COMPANY 2701 Washington Boulevard, Bellwood, Illinois

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Indium Solders

Covering indium alloys, a 33-page technical-data booklet also contains specific data on Indalloy solders. These solders have melting points and working temperatures between those of soft solders and commercial hard solders. They are used in soldering to metals, to nonmetallic substances, and to thin metal films. (Indium Corp. of America)

For free copy circle No. 22 on postcard

Motors and Reducers

Slow-speed gear motors and reducers are featured in an eight-page bulletin. Illustrations cover basic types along with unusual modifications. (Sterling Electric Motors)

For free copy circle No. 23 on postcard

Thermocouple Tubing

The subject of a brief bulletin is high-temperature swageable thermocouple tubing. The tubing is extruded from spectrographically-analyzed alumina, magnesia, and stabilized zirconia materials. Describing the tubing, the bulletin also presents details on chemical analysis, standard sizes, and tolerances of single- and multi-bore tubing. (Saxonburg Ceramics, Inc.)

For free copy circle No. 24 on postcard

Eliminate Dust

Use of cloth filtration and cyclonic equipment for eliminating dust and air-pollution problems in industry is described in a 28-page brochure. Illustrated data shows how industry uses this equipment to collect waste dust or to return valuable, reusable material to a manufacturing process. (Dracco Div., Fuller Co.)

For free copy circle No. 25 on postcard

Plastic Insulators

High mechanical strength, afforded by laminated-plastic insulators, is discussed in an actual case history. High speed, mechanized handling—which could cause damage and breakage of 12-point radical stators—led a company to adopt the plastic insulators. This afforded not only the needed electrical properties but also the mechanical strength required. (Taylor Fibre Co.)

For free copy circle No. 26 on postcard

Multi-Outlet System

The effective use of a multi-outlet system on different types of benches is shown in two new data sheets. One data sheet covers the use of the raceway plug-outlet system on test benches at a magnetics plant. Here, a multiplicity of outlets was required to handle diversified-testing equipment now, and provide for increased future requirements. The installation featured in the second data sheet shows the system being used to carry branch circuits, and as a multi-outlet system at an aircraft instrument repair shop. (The Wiremold Co.)

For free copy circle No. 27 on postcard

Tapping

A 12-page research report informs readers on the relationship between core-hole size, tapping torque and thread strength. (Production Engineering Research Assn. of Great Britain)

For free copy circle No. 28 on postcard

Broaching Fixtures

Unitized broaching fixtures are presented in a 12-page two-color revised catalog. The illustrated catalog describes a variety of self-contained, air-powered broaching fixtures for producing keyways, slots, flats, small splines, oil grooves, serrations, deburred sur-

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FREE LITERATURE

faces and holes of various shapes. An array of photographs, line drawings and idea sketches shows typical applications. Complete production data are included for each application. (National Broach & Machine Co.)

For free copy circle No. 29 on postcard

Numerical Controls

Features, operations and specifications, on transistorized numerical controls for machine tools, appear in brochure form. A complete description of the unit, which can be applied to any machine that requires two or three-axis positioning, is presented. (Industrial Systems Div., Hughes Aircraft Co.)

For free copy circle No. 30 on postcard

Silicone Rubber

The subject of a new bulletin concerns itself with custom-engineered, fabricated silicone rubber. The bulletin describes engineered seals for the aircraft, electronic and appliance industries, precision-molded parts, extruded parts, and sheet and die cuts. From the manual, it's possible for the engineer to select and specify the correct silicone-rubber part to meet typical application problems. (Haveg Industries, Inc.)

For free copy circle No. 31 on postcard

Angle Valve

Features and specifications of a universal angle valve are described and illustrated in a data sheet. The valve is employed on liquid-level gages or instrument piping and for general uses. (Jerguson Gage & Valve Co.)

For free copy circle No. 32 on postcard

Nickel Alloy Guide

A buyer's guide to nickel alloy steels provides a useful reference. The 27-page booklet is divided into two sections. Part I lists the steel service centers and their nickel stocks, alphabetically. Part II lists the nickel alloy steels—by AISI number when available—and their respective steel service centers supplying them. (The International Nickel Co., Inc.)

For free copy circle No. 33 on postcard

Power-Supply Units

Tabular specification data, on more than 400 separate power-supply models, is contained in a 32-page handbook and catalog. The publication covers a complete line of regulated dc supplies, frequency changers, high-voltage power supplies (to 600 kv) and other high-voltage products such as ac line-voltage regulators. (Sorenson & Co.)

For free copy circle No. 34 on postcard

High-Pressure Hose

Transparent polyvinyl - chloride hose, reinforced with open-mesh nylon, withstands pressures up to 1500 psi. This hose is recommended for factory air lines, fuel pressure lines, oil lines and high-pressure machinery lines. Working temperature ranges from —5° to +170°F. Bursting pressure of the ⅛-in. ID hose is 1500 psi. The ¼-in. ID hose withstands 1200 psi —and ½ in. is good to 800 psi. Conventional fittings can be used. A free sample is available with literature. (Newage Industries, Inc.)

For free copy circle No. 35 on postcard

Cutters and Gear Hobs

Information, on the selection of multiple-thread milling cutters and fine-pitch gear hobs, and how to order, is included in a catalog and net-price list. (Hanson-Whitney Co.)

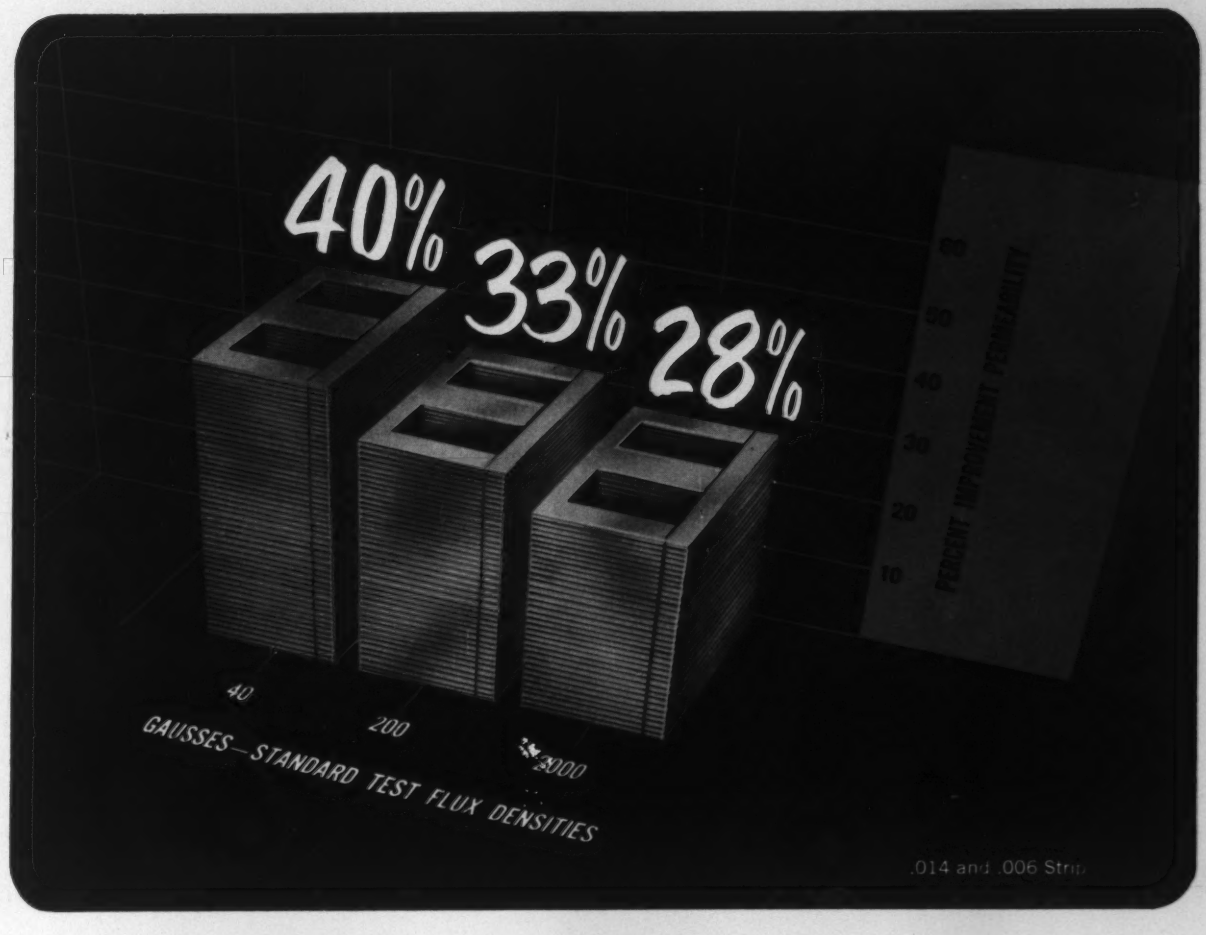
For free copy circle No. 36 on postcard

Epoxy Compounds

Stating product properties, a four-page catalog outlines 25 epoxy-based plastic products. The products are adaptable for use in pattern work, contour duplication, drill jigs, and other tooling applications. They can also be used in draw dies and drop-hammer dies. (Ren Plastics, Inc.)

For free copy circle No. 37 on postcard

Experience**—the added alloy in **A-L Electrical Steels



Higher permeability values now guaranteed for Allegheny Ludlum's Moly Permalloy

Means new, consistent and predictable magnetic core performance

Molybdenum Permalloy nickel-iron strip is now available from Allegheny Ludlum, with higher guaranteed permeability values than former typical values. For the buyer, this new high quality means greater uniformity . . . more consistent and predictable magnetic core performance.

This higher permeability is the result of Allegheny Ludlum's intensive research on nickel-bearing electrical alloys. A similar improvement has been made in AL-4750 strip steel. A-L continues its research on silicon steels, including Silectron, well-known grain-oriented silicon steel, and other magnetic alloys.

Complete facilities for the fabrication and heat treatment of laminations are available from Allegheny Ludlum. In addition, you can be assured of close gage tolerance, uniformity of gage throughout the coil, and minimum spread of gage across the coil-width.

If you have a problem relating to electrical steels, laminations or magnetic materials, call A-L. Prompt technical assistance will be yours. And write for more information on Moly Permalloy. ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.***

Address Dept. A-4.

WSW 7490

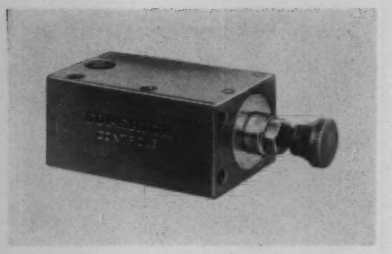
ALLEGHENY LUDLUM

STEELMAKERS TO THE ELECTRICAL INDUSTRY

Export distribution, Electrical Materials: AIRCO INTERNATIONAL INC., NYC 17
Export distribution, Laminations: AD. AURIEMA, NYC 4

AL

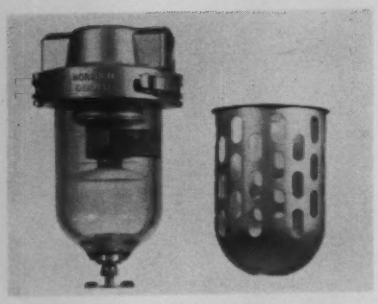
New Materials and Components



Single-Acting Cylinder Saves Time and Space

Designed with a 1-in. bore and a ¾-in. stroke, a single-acting cylinder mounts either horizontally or vertically. Some of its features are: ½-in. ram, drilled and threaded with 5/16-18 internal thread to allow insertion of hardened face pad or 15°-swivel pad; adaptable for other types of tooling; can be used for air, oil or water to 150 psi. The cylinder is ideal for clamping, work feeding, and ejection of parts. (Superior Controls)

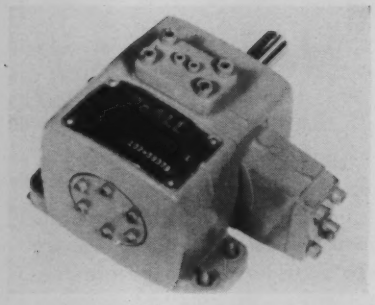
For more data circle No. 40 on postcard, p. 111



Filters Remove All Liquid From Compressed Air

Improved baffling on a new line of air-line filters makes possible 100-pct liquid removal from compressed air. A new transparent bowl has a high safety factor, and a much greater resistance to fatigue under cycling loads. Featuring quick and easy cleaning, the filter also has a removable perforated metal guard. Transparent-bowl and metal-bowl air-line filters are used with each of the following pipe sizes: ¼, ⅜, and ½ in. Four optional and interchangeable filter elements remove solid particles from the compressed air. (C. A. Norgren Co.)

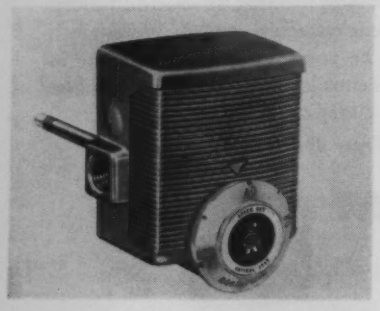
For more data circle No. 41 on postcard, p. 111



Line of Pumps Meets Operating Requirements

Four new variable-volume pumps employ the movable-cam-ring principle. This principle automatically adjusts volume to demand while maintaining constant pressure. The pumps deliver only the amount of hydraulic fluid necessary, at a constant pressure for the load at any given instant. Power is not wasted, and little heat is produced. The pumps often eliminate the need for additional electric motors, and in many cases reduce power requirements. Two models are 500-psi, 7-gpm pumps, and the other two are 1000-psi, 6.5-gpm pumps. (The DoAll Co.)

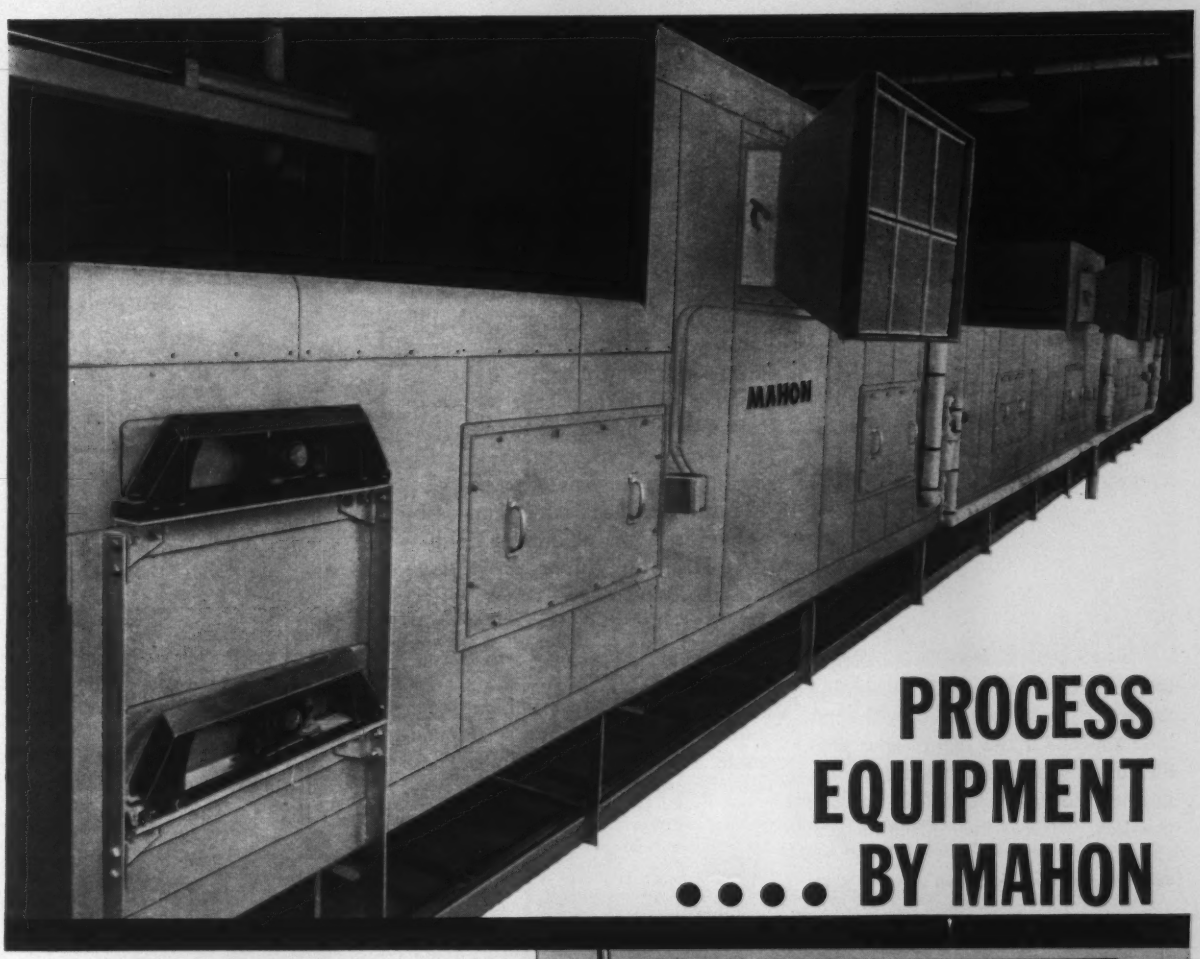
For more data circle No. 42 on postcard, p. 111



Control Supplies Hot Water in Peak Periods

Featuring a simple dial for selection of hot-water recovery speed, an automatic control provides adequate hot water; even in peak periods when the water heater ordinarily would be taxed beyond capacity. The set knob has three settings designating recovery speeds; intermediate positions may also be used. The outlet pressures for the control provide adjustable outlet rates of 2- to 5½-in. water-column pressure, using city gas, on a water heater operating in these limits. Markings on a retainer plate indicate temperature adjustments. (Robertshaw-Fulton Controls Co.)

For more data circle No. 43 on postcard, p. 111



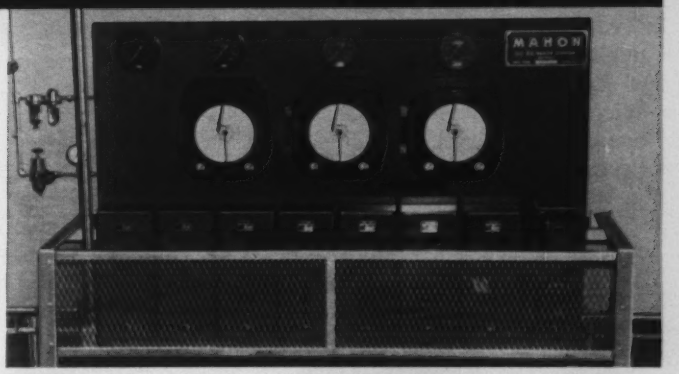
PROCESS EQUIPMENT .... BY MAHON

new plastic-curing oven system for GOODYEAR is double-decked for efficiency

Curing of 75-ft. long, 7-ft. wide sections of a spongy plastic material, with heating and cooling cycles rigidly controlled, is a tough processing problem. Mahon equipment does the job two-at-a-time . . . and also automates the method! This new oven system converted the operation to a smooth, continuous process.

The unusual installation (shown above) is 80-ft. long with double-decked ovens for increased capacity. Specially developed by Mahon and Goodyear engineers, the system features integrated materials handling, precisely controlled heating and rapid cooling. Curing is done at preset temperatures up to 300°F, the ovens holding the plastic sections for about eight hours. At the end of this cycle, the entire system is fast cooled, the work discharged and the ovens brought back up to heat—all automatically.

If you are considering new or improved process equipment call in a Mahon engineer . . . their assistance could prove invaluable.



Special oven control panel, designed by Mahon for the Goodyear Tire and Rubber Co., monitors the entire eight-hour curing cycle for the plastic material.

Write for Descriptive Catalog A-660 on the scope of Mahon Industrial Equipment for metal finishing, cleaning, painting, heating, heat treating, etc. Also in Sweet's Plant Engineering File.

THE R. C. MAHON COMPANY

Detroit 34, Michigan

YOUR BIGGEST VALUE is in MAHON'S planning and engineering EXPERIENCE

MAHON

Manufacturing Plants—Detroit and Los Angeles, Calif.
Sales-Engineering Offices in Detroit, New York, Chicago, Los Angeles and San Francisco

Tungsten-Alloy Ingots

Tungsten-alloy ingots, weighing over 500 lb, are produced by the double-melt vacuum arc process. They are approximately 10-in. diam and 14-in. long. Finished parts are made by direct machining of the ingots. Tool wear has been found

to be great, but good machining rates are being obtained with carbide tools. Of the ingots now produced, most are being used in rocket nozzle inserts for solid-fuel ballistic missiles. (Oregon Metallurgical Corp.)

For more data circle No. 44 on postcard, p. 111

Remote Receiver

An all-electric, round-dial remote receiver provides remote indication of gas and liquid pressure, draft, differential pressure, flow, temperature, and liquid level. Using remote electric transmission eliminates the

danger of high pressure and temperature lines at panel boards; also, impulse piping requirements are reduced to the short length needed between point of measurement and the transmitter. Great speed of response is possible in the new receiver. The remote receiver makes use of the company's wide variety of remote electric transmitters, which complete the system. (The Hays Corp.)

For more data circle No. 45 on postcard, p. 111

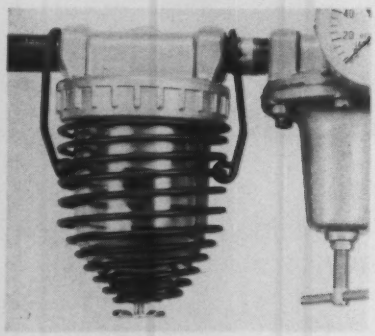
Aluminum Coating

High-sheen, rust-inhibitive aluminum finishes are now possible with a new, long-lasting aluminum coating. The protective finish retains a high luster under the severest adverse conditions. It withstands temperatures up to 1000°F. The coating can be painted over damp or rusted surfaces safely and easily wherever a fine aluminum finish is desired. (The Wilbur & Williams Co., Inc.)

For more data circle No. 46 on postcard, p. 111

Bowl Protector

Wire-cage guards supply protection to the plastic bowls of pneumatic filters and lubricators. These wire cages restrain the flying par-



ticles from bowl explosions. Retaining visibility, the cages attach to pipe line by movable hooks. Three sizes fit all bowls from ¼-1 in. (C. W. Morris Co.)

For more data circle No. 47 on postcard, p. 111

Thermocouple

For measuring molten-metal temperatures, an expendable immersion thermocouple combines improved economy, faster response, high accuracy and simplified assembly. The unit's design consists of a ceramic base which serves as a mounting for the noble-metal thermocouple wires. A firmly-anchored transparent fused-silica tube protects the thermocouple wires, and is, in turn,

HPW

NEW

CPW

NEW

The forgings you see here are about to get the cleaning of their life in Houghton's new CERFA-KLEEN HPW . . . one of two new Cerfa-Kleens designed specifically for faster and more efficient production line power washing.

Cerfa-Kleen

METAL CLEANERS

for power washers—hot or cold

Whether you use power washers, soak tanks, or mechanical cleaning processes, there's a brand new Cerfa-Kleen job-tailored to (1) clean faster and better (2) to be easier and safer to use and (3) to give you EXTRA benefits such as built-in rust preventives, water softeners, non-foaming and free rinsing characteristics when you want them. Best yet, you don't have to pay for special formulations when there's a Cerfa-Kleen to handle most cleaning jobs.

For Hot Power Washing

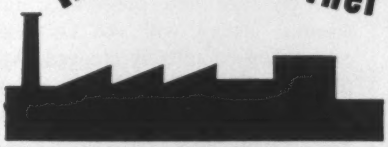
A new, more powerful hot spray cleaner with built-in rust protection. Contains Houghton's Rust Veto M.P., a multi-purpose water soluble rust preventive which leaves an imperceptible but effective and long-lasting film on work after soil has been completely removed. Dissolves readily and provides a strong, bi-phase detergent action. Non-foaming, non-caking, free-flowing and non-caustic. Contains no free caustic. Recommended for heavily soiled ferrous metals, for aluminum and most non-ferrous applications.

For Cold (room temp.) Power Washing

A highly effective formulation of fast-dissolving mild alkalies that work at room temperature and save heating costs. Features a built-in water softener and rust preventive. Like all Cerfa-Kleens, CPW is non-caking, non-dusting, free-flowing with no free caustic. It combines all bi-phase solvent alkali cleaning with non-foaming organic detergency boosters to help remove soil that's stuck tight. Non-corrosive and non-staining on aluminum, copper or brass. Recommended for removing cutting and grinding oils, light drawing or stamping compounds and similar oil-type contaminants.

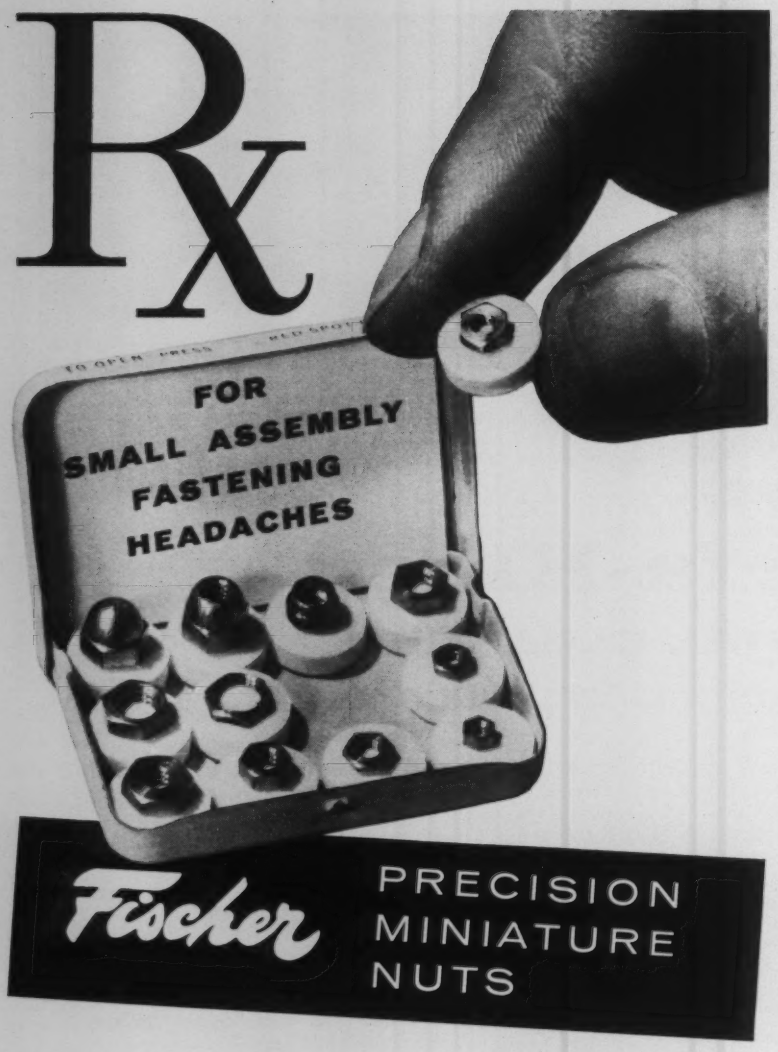
For details about Houghton's new Cerfa-Kleens, or our full range of industrial metal cleaners, call your Houghton Man today, or write: E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

Industry's Partner in Production



E. F. HOUGHTON & CO.

Philadelphia, Pa. • Chicago, Ill. • Carrollton, Ga. Detroit, Mich. • San Francisco, Calif. • Toronto, Canada



In miniaturized products, fastening delicate components securely in place can be a major production "headache". If the fasteners used are not accurate, uniform and easy to install, assembly operations become a costly nightmare.

To help solve this critical problem, Fischer is supplying precision turned miniature nuts that are tapped square (within 1°) to Class 2 tolerances, with lengths and diameters held to +.000″ and −.005″. Sizes range from ⅛″ hexagon and include standard, special and odd size or shape nuts with standard or special threads from No. "0". In addition, all Fischer nuts are furnished burrless, cleaned and ready to use.

Whatever your application, if you require extreme accuracy and prompt "on schedule" delivery at competitive prices . . . let Fischer quote your next miniature nut order.

WRITE TODAY FOR ADDITIONAL MINIATURE DATA.

there's no premium for precision at

Fischer SPECIAL MFG. CO.

445 MORGAN STREET • CINCINNATI 6, OHIO

8814-PS

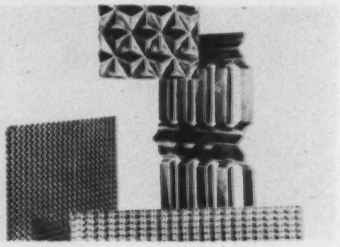
DESIGN DIGEST

protected from slag and floating solids by a special metal cap. Design of the unit also assures that molten metal cannot penetrate the assembly and damage the plug receptacle. (Engelhard Industries, Inc.)

For more data circle No. 48 on postcard, p. 111

3-D Sheet

A line of colorful three-dimensional sheet finds wide use in such applications as spandrel panels, ceilings, decorative overlays, and in many other areas. Four designs

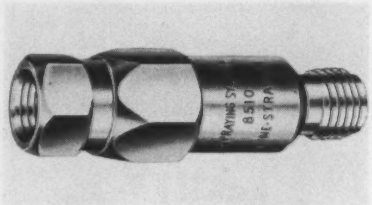


are available, each with its own special pattern. The designs are available in a single standard alloy, size and temper. The sheets measure 4 x 8 ft. (Aluminum Co. of America)

For more data circle No. 49 on postcard, p. 111

High-Pressure Strainer

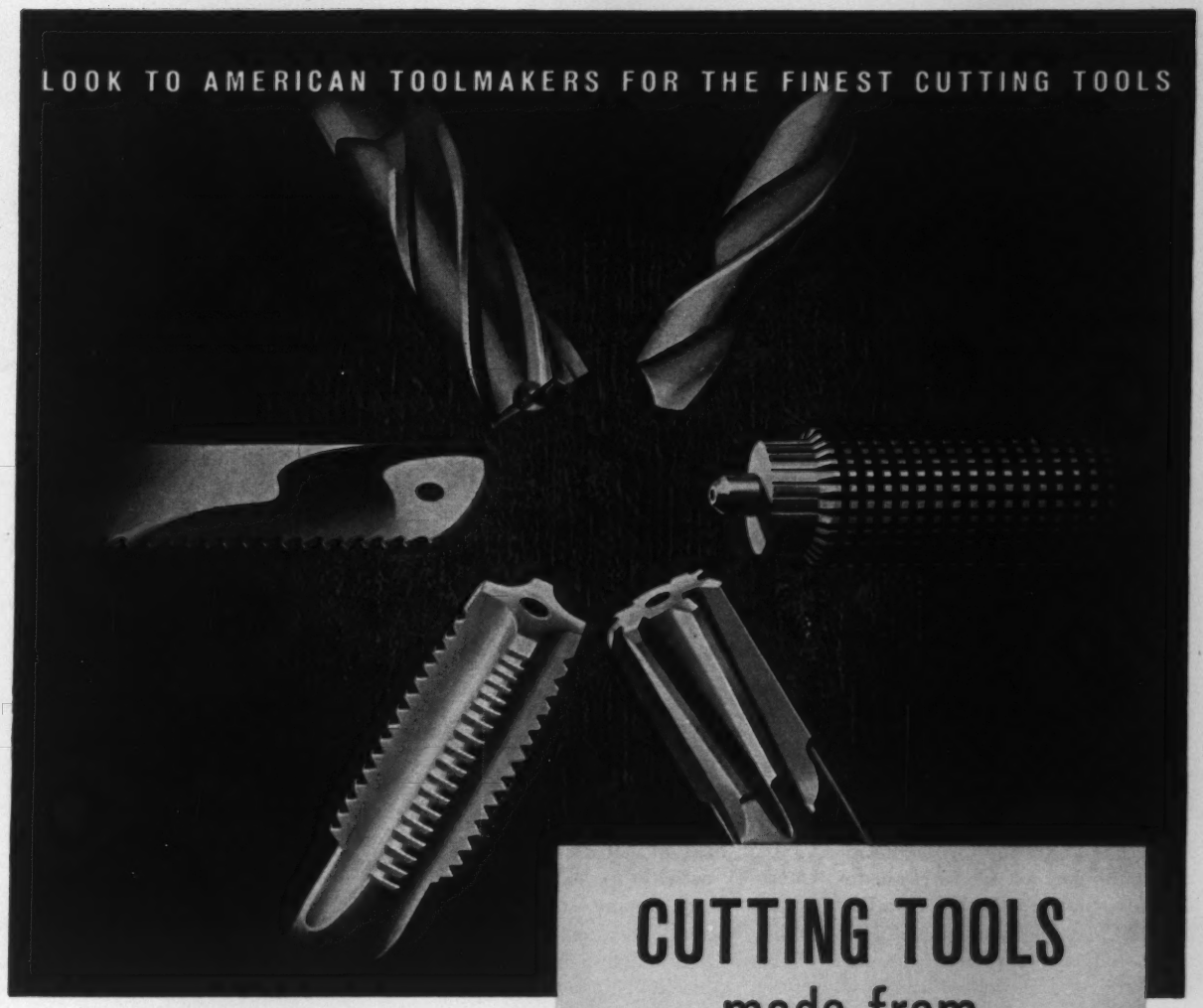
For pressures up to 5000 psi, a high-pressure strainer has ¼-in. NPS male inlet and ¼-in. NPS female outlet connections. The strainer is made of stainless steel with choice of 50-, 100-, or 200-mesh screens. Designed to resist all



line pressure and conditions, the strainer screen will not collapse, even when completely clogged. Applications include: airless paint-spray guns or any other high-pressure ¼-in. NPS line application. (Spraying Systems Co.)

For more data circle No. 50 on postcard, p. 111

LOOK TO AMERICAN TOOLMAKERS FOR THE FINEST CUTTING TOOLS



CUTTING TOOLS made from HIGH SPEED STEELS *are Better Than Ever*

Today's high speed steel tools for tapping, drilling, milling, broaching, reaming, sawing and other metal cutting operations are better than ever. Through research and development, and new and better production methods, American toolmakers are constantly improving high speed steel tools to help you make better products . . . at less cost.

As a leading producer of high speed and other specialty steels, Universal-Cyclops continues to aid your toolmaker's efforts with its own aggressive research and development program.

Look to your American toolmaker for the finest in high speed steel cutting tools!

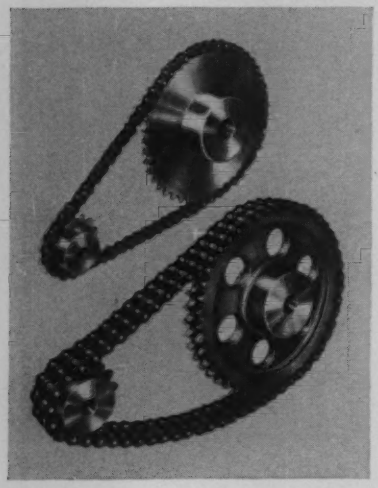
UNIVERSAL CYCLOPS
STEEL CORPORATION
BRIDGEVILLE, PA.

TOOL STEELS • STAINLESS STEELS • HIGH TEMPERATURE METALS

DO YOU HAVE THE PROPER

CHAIN SELECTION

FOR YOUR EQUIPMENT?



If there is a question in your mind about the correct size of chain to use for your particular installation, ACME Engineers will gladly assist you in selecting the proper chain drive. This depends on how much horsepower you want to transmit . . . the speed and size of your shaft . . . space limitations . . . hours of continuous operations, etc.

Consult your nearest ACME Distributor or write our Engineering Department for the answer to your CHAINING PROBLEMS.

See us at the Design Engineering Show May 23-24-25-26 Booth 413

Write Dept. 21-K for new 100-page illustrated technical catalog including new engineering section showing 36 methods of chain adjustments.

Acme Chain Corporation

HOLYOKE MASSACHUSETTS

NEW BOOKS

"From Ox Carts to Jets: Roy Ingersoll and the Borg-Warner Story" by Will Oursler. In 1929, Roy C. Ingersoll united his family's small, bustling steel business with a new kind of "super-company" named Borg-Warner. At the time, Roy's retired father predicted that Roy had doomed himself to the fate of a small frog in a big puddle. Twenty-one years later, Roy became Borg-Warner's chairman of the board. The author shows how Ingersoll and his company won prominence and prosperity in the risky, rapidly changing world of American industry. 346 pp. $4.95. Prentice - Hall, Inc., Englewood Cliffs, N. J.

"The Mechanics of Aerosols," by N. A. Fuks, Academy of Sciences of the U.S.S.R., has been translated by E. Lachowicz, Chemical Warfare Laboratories, U. S. Army. The book contains a classification, analysis and description of the broad field of aerosols. It relates aerosol activity to such fields as meteorology, botany, soil conservation, bacteriology, nuclear physics, insecticide production and industrial waste control. Numerous illustrations, tables and diagrams appear throughout the text. 460 pp. $7.50. Office of Technical Services (Order 59-21069), U. S. Department of Commerce, Washington 25.

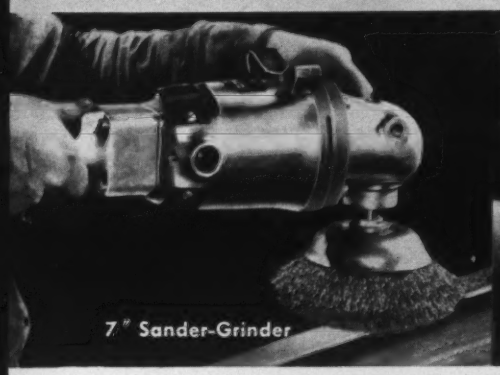
"Vacuum Processing in Metalworking," by J. W. Cable, offers a practical treatment of the relatively new field of vacuum metalworking. The first few chapters outline general phases of vacuum technology, such as the means of producing low pressures and their measurements. The author also devotes individual chapters to particular phases of vacuum processing. He outlines the latest developments, among which are electron beam welding. In general, the aim of the book is to present vacuum technology in a descriptive manner, rather than in a highly technical form. As a result, the book will prove helpful to any industry that's involved in the refining and processing of metals. 202 pp. $5.50. Reinhold Publishing Co., 430 Park Ave., New York 22.

"Machine Shop Operations and Setups," second edition (1960), by H. W. Porter, C. H. Lawshe and O. D. Lascoe, presents modern instruction in machine shop techniques. The authors have incorporated widely-used operations into their clearly-written text. They've also repudiated the practice of useless repetition of out-of-date practices. Readers will see the demand for greater emphasis on operations and setups brought skillfully and comprehensively to fruitation. Illustrations show various operations, safety measures and modern equipment in ultra-clear detail. 449 pp. $5.50. American Technical Society, 848 East 58th St., Chicago 37.

"Exhibition and Display," by J. Gardner and C. Heller, presents a guide to effective exhibition. The authors study the problems of designing exhibits to explain, to create, and to sell—the three activities which, alone or in combination, are the object of any exhibit. The book covers many aspects, from industrial and government displays, to arranging store windows and sales floors. 190 pp. 350 photographs and line drawings. $13.75. F. W. Dodge Corp., 119 West 40th St., New York 18.

"Connecting Induction Motors," fourth edition, by A. M. Dudley and S. F. Henderson, presents an up-to-date treatment of the operation and repair of single and polyphase induction motors. The book includes tables of voltages showing how connections may be changed for any combination of phases and voltages. More than 400 illustrations and diagrams are provided. 425 pp. $13.50. McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36.

PRODUCTION...CONSTRUCTION...MAINTENANCE



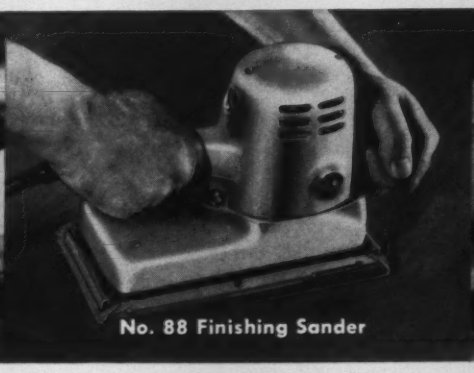
7" Sander-Grinder

No. 12 Scrugun®

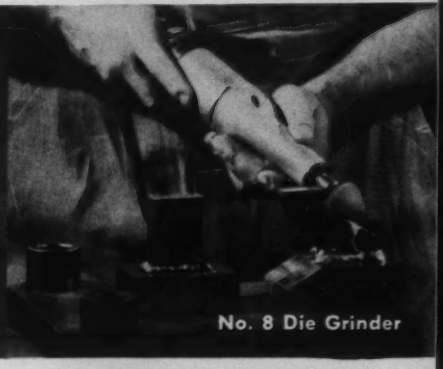
No. 11 Jig Saw

whether the job's drilling, sanding, sawing,

7" Super-Service Saw

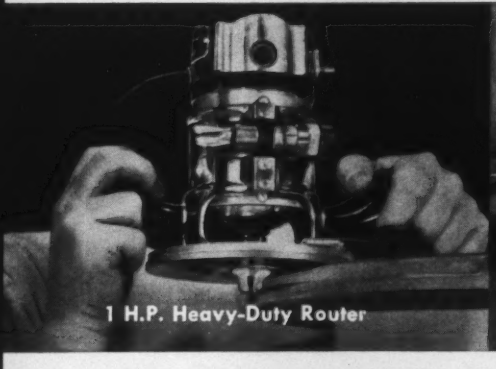


No. 88 Finishing Sander

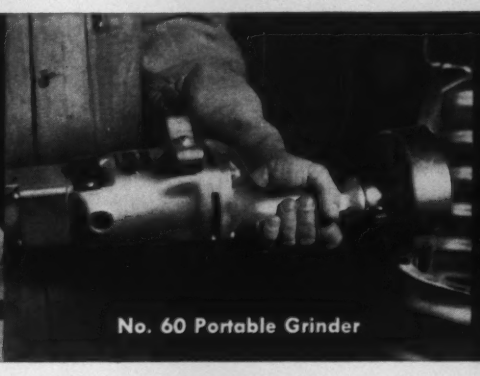


No. 8 Die Grinder

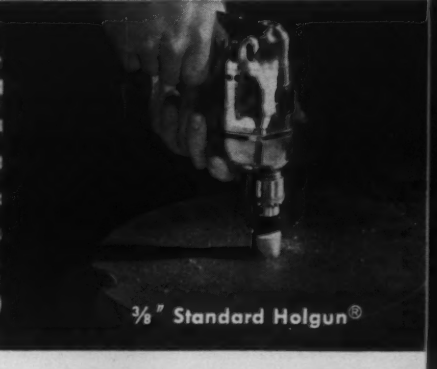
or any other tool job, you'll find that



1 H.P. Heavy-Duty Router



No. 60 Portable Grinder



3/8" Standard Holgun®

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Save time whenever you need a portable electric tool . . . simply call your local Black & Decker distributor. He stocks over 125 tools and 3,000 accessories to give you complete selection, fast delivery, tool know-how and personal service. Or, for complete tool information mail coupon at right.

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☐ Belt Sanders

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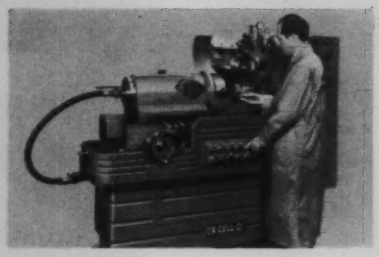
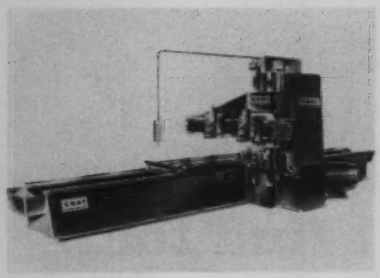
New Equipment and Machinery



Internal-Thread Grinder Suits Variety of Work

Equipped with a precision spindle arranged to run at 15,000 rpm, a thread grinder has a range of grinding-wheel speeds. By changing pulleys, speeds under and above 15,000 rpm are obtainable. Facilitating small-work grinding, a high-frequency spindle provides wheel speeds adjustable between 42,000 and 60,000 rpm. Grinder's operations are: grinding of multiple lead threads, tapers, and radius forms. (Ex-Cell-O Corp.)

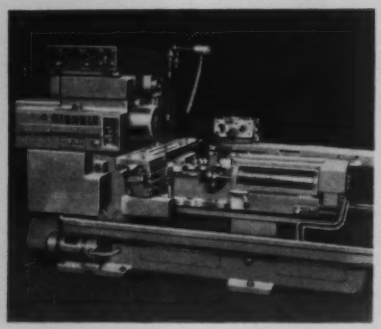
For more data circle No. 51 on postcard, p. 111



Planer Cuts in Either Direction

Designed for fast carbide planing, a new small planer features rugged components engineered to resist torsional deflection and vibration under the heaviest of cuts. The rail and the rail heads, and the wide face on the column are all square locked. This square-locked design resists the forward and reverse thrusts produced in double cutting. The transmission provides a smooth, non-pulsating motion to the table on long and short strokes. Table speeds are from 30 to 300 fpm. (The G. A. Gray Co.)

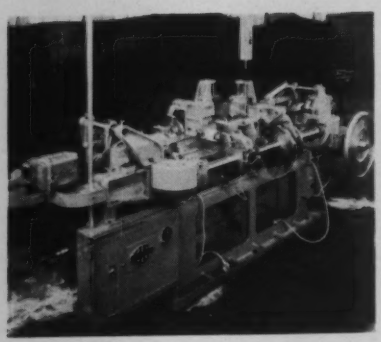
For more data circle No. 52 on postcard, p. 111



Turret Lathe Handles Both Bar and Chucking Work

An automatic ram turret lathe, combines automatic-cycle efficiency with the versatility and quick setup of the hand-operated ram-type turret lathe. The automatic cycle permits use of inexperienced personnel. The operator's job is reduced to chucking the work, starting the cycle, and removing the finished part. Spindle-speed selection, back feed, right- or left-hand threading, manner of cross-slide operation, and collet-chuck and bar-feed operation are pre-set. Standard tools are used; there are no new tool setup methods to learn. Cross-slide operation is entirely independent of the hex turret. (Gisholt Machine Co.)

For more data circle No. 53 on postcard, p. 111



Multi-Slide Machine Serves Many Operations

Stock from coils can be fed into both ends of this multi-slide machine. This arrangement is ideally suited for the fabrication of assemblies, which could include two stampings, both made and assembled in the machine; or two stampings made in the machine, and assembled with a prefabricated hopper-fed member. Also, the machine could make, at the same time, two entirely different stampings not requiring assembly. Accomodating material up to 3 in. in width, it provides feed length adjustable up to 6 in. The machine has an automatic lubrication system, air-clutch-brake mechanism, and a 7½-hp drive. (U. S. Tool Co., Inc.)

For more data circle No. 54 on postcard, p. 111

US RUBBER GRINDING WHEELS

"U.S." Grinding Wheels installed on Naxos-Union roll grinder.

"We're standardizing on 'U.S.' GRINDING WHEELS"

—Mr. Alex Munroe, Revere Copper & Brass, Inc.

After Alex Munroe of Revere's Baltimore plant installed "U.S." Grinding Wheels on their Naxos-Union roll grinders (for reconditioning rolls on their Sendzimir 51" rolling mill) several things were immediately apparent. Chatter was eliminated and stock removal was clean and efficient. Grinding time was cut approximately 30% while producing a regular finish.

That's why Revere is standardizing on "U.S." Grinding Wheels, not only on roll grinders but for reconditioning large back-up rolls. In fact, wherever "U.S." Wheels are used, performance reports have been excellent.

If you, as a manufacturer, want to reduce grinding wheel costs and increase production, "U.S." has what it takes. For "U.S." Wheels consistently outperform and reduce costs in case after case. Get in touch with your "U.S." Representative today or write or call the address below.

US RUBBER

Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

Somers

STAINLESS STEEL

THIN STRIP

.010 to .001 25" wide; down to .00015 in narrower widths.

All regular commercial tempers.

Commercial bright anneal finish.

Unique annealing facilities provide uniform temper and uncontaminated surface.

Coils or cut lengths, both with #3 edge.

302, 305, 321, 347, 430, 17-7PH, PH15-7MO plus various high temperature alloys and rare metals.

Available for prompt shipment in production quantities.

FOR EXACTING STANDARDS ONLY

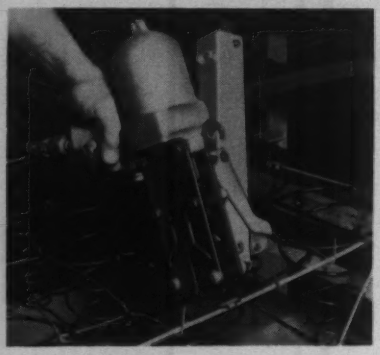
Somers THIN STRIP

Somers Brass Company, Inc.
102 BALDWIN AVE., WATERBURY, CONN.

NEW EQUIPMENT

Clip Applicator

Weighing only 5¾ lb, a portable, air-powered, magazine-fed clip applicator secures two wires to each other. The machine can apply a clip securely in less than a second.

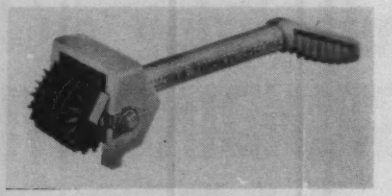


There are two models of the pneumatic tool—one for joining 7-11 gage wires, and another for wires of 11-13 gage. The recommended air pressure is 75 psi. (Paslode Co.)

For more data circle No. 55 on postcard, p. 111

Heavy-Duty Dresser

Consisting of 2⅜-in. diam cutters and a 2-ft cutting face, a heavy-duty dresser features an improved bearing assembly. The assembly furnishes six bearing holes; eliminating wear on the pistol-grip handle. The six holes in each bearing are drilled through, allowing the cutters to be changed easily without removing the cutter assembly from the head. The unit is suitable for all dressing on medium and large wheels, and is particularly well-suited for wide-faced wheels. (Machine Products Corp.)



For more data circle No. 56 on postcard, p. 111

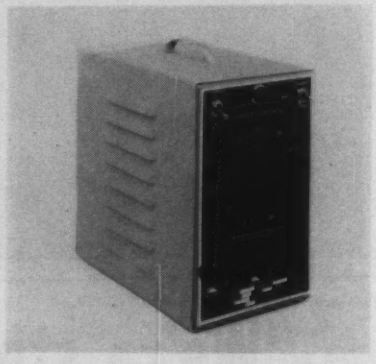
Miniature Lathe

Sixteen-inches long, a precision machine lathe combines up to ten power tools in one small unit. The machine combines in itself a lathe, drill press, tool and surface grinder, vertical-milling machine, detachable hand drill and a polishing and grinding machine. Its 11-speed belt-drive system provides from 255 to 4000 rpm, operating on regular ac or dc 115-v current. The unit can turn out work to within ±0.0005 in. (Chicago Apparatus Co.)

For more data cirlce No. 57 on postcard, p. 111

Motor-Speed Controls

For use with ¼- and ½-hp shunt-wound motors, a line of tubeless motor-speed controls meets the demands for a heavy-duty unit requiring no warm-up time. Full wave control may be switched from forward to reverse at any motor-speed setting, and speed range is 18:1 at full-rated motor torque. The device features an internal terminal strip for easy adaptation of limit switches, and a remote "forward-brake-reverse" switch. Varying the armature voltage, with an autotransformer, controls motor speed. The unit's case is of heavy 16-gage steel, finished in grey. The case measures 5¾-in. wide, 9¼-in. high, and 9⅜-in. deep, not including knob projections. Net weight is 16 lb. Models are available for either 115-v, 60-cycle, or 230-v, 60-cycle input. (Minarik Electric Co.)



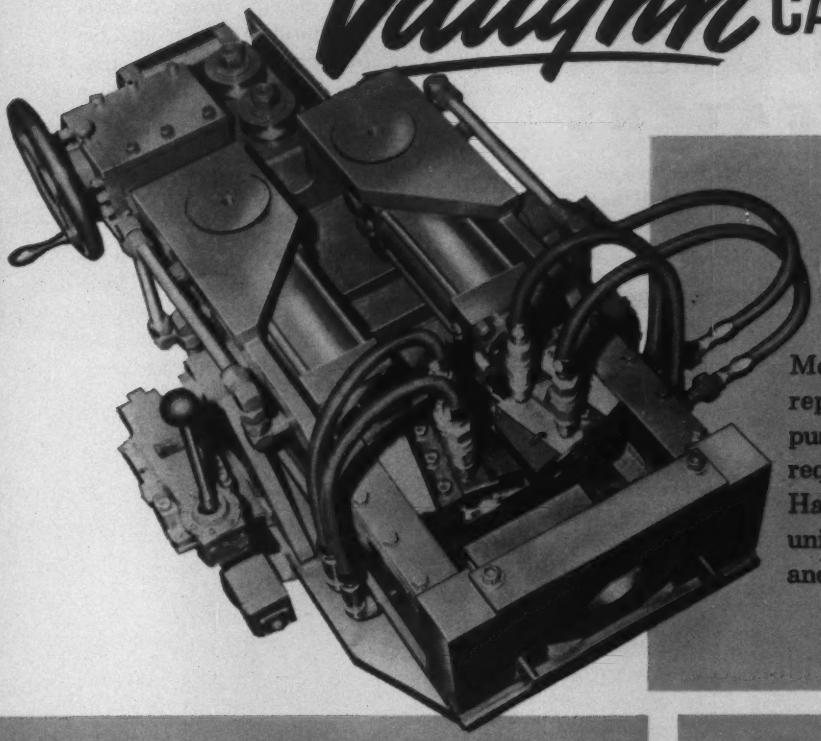
For more data circle No. 58 on postcard, p. 111

Coating Stripper

Used at room temperature, an effective stripper removes epoxies, acrylics, alkyds and baked enamels from aluminum, copper, brass, steel, and stainless steel. The stripper is of the bond-releasing type, and once

Name your **pointing** and **straightening** needs...

Vaughn® CAN MEET THEM!



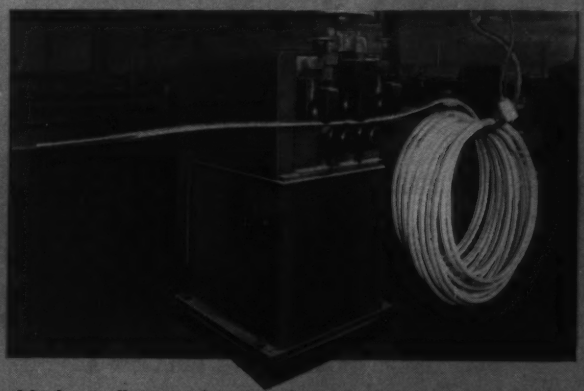
New VAUGHN HYDRAULIC PUSH POINTER

Mounted on the heavy duty Motobloc, replacing the die block, this compact push-type pointer eliminates floor space required for a separate 4-roll machine. Handling rod sizes from ½" to 1¼", the unit is hydraulically operated, and points and pushes rod through die into Motobloc.®

VAUGHN EXTRA HEAVY 4-ROLL CONTINUOUS POINTER

A specialized unit for heavy service, ruggedly constructed for long useful life. Accommodating rod from ½" to 1¼", this pointer has two vertical and two horizontal rolls—points rod easily without twist.

VAUGHN ROLL STRAIGHTENER



Mechanically straightening the end of the coil in preparation for moving to pointer and die box, the 3-roll straightener saves time, manpower and money while boosting production. Unit with over-riding clutches is available for use with continuous processing lines.

"Quick on the Draw!"®

The VAUGHN MACHINERY COMPANY

Cuyahoga Falls, Ohio, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

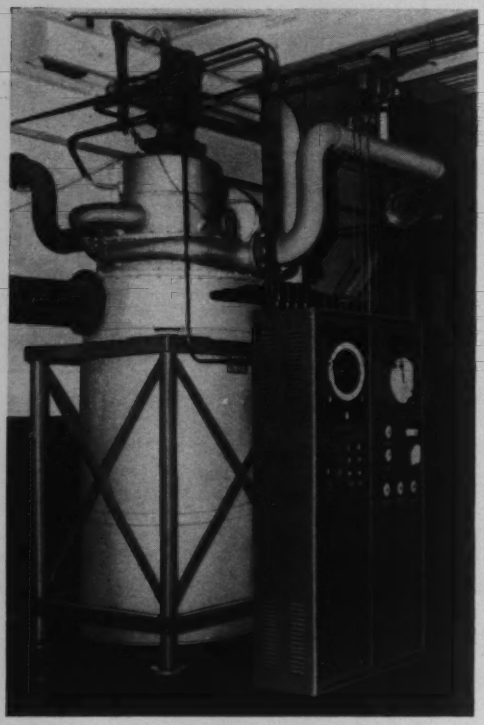
Vaughn Builds
A COMPLETE LINE OF POINTING MACHINES FOR ALL ROD AND WIRE SIZES
Write FOR DETAILS

TESTED AND PROVEN

THERMAL

FIRED AIR HEATERS

Efficient, flexible, and compact, THERMAL direct and indirect fired air heaters have proved themselves in many industries. Built around the THERMAL high-velocity burner, they normally require no refractory, and operate efficiently on gas, light oil, residual oils, or waste fuel.



THERMAL fired air heaters can be adapted to pressures from 100 psig (direct fired) to 1500 psig (indirect fired), and in ranges from 250,000 to 50 million BTU/hr. They provide process heating for a wide variety of tasks, such as drying, heating annealing gas, cupola hot blast heating, and recirculating type furnaces and ovens.

THERMAL heaters offer you high versatility and lightning-speed response and are available as completely packaged units, with all safety and control equipment, ready to install.

SEND FOR BULLETINS

Bulletin #112 describes direct fired air heaters and Bulletin #113 covers the indirect fired heaters.

THERMAL

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Other Thermal Products & Services:

Gas, Oil & Combination Burners
Heat Exchangers
Air Heaters
Gas Generators
Submerged Combustion
Combustion & Heat Transfer Equipment

NEW EQUIPMENT

the bond is broken, the coating flushes off cleanly under a water spray. Requiring no heat and because it is non-flammable, the stripper is safe and easier to handle than many other types. (The ESBEC Corp.)

For more data circle No. 59 on postcard, p. 111

Pocket Receiver

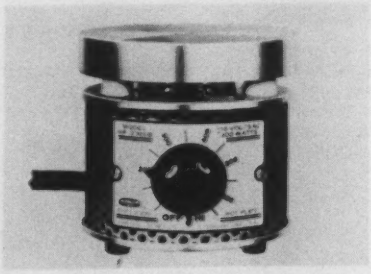
Weighing just over 10 oz, a high-powered, fully-transistorized VHF pocket receiver provides reliable voice communications, even in noisy locations. It is available for oper-

ation in the 25-24 and the 144-174 megacycle frequency bands. Worn in a pocket or clipped to the belt, the unit operates from either a rechargeable battery or from mercury cells. (Motorola Inc.)

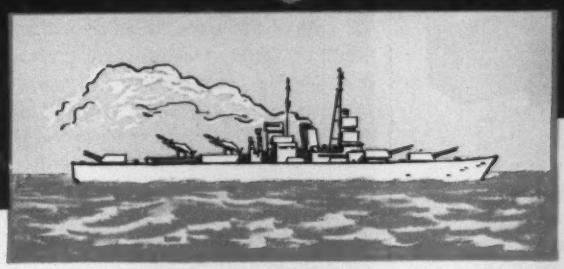
For more data circle No. 60 on postcard, p. 111

Hot Plate

Incorporating a thermostatic control unit, a round hot plate features small size (3½-in. diam top) and precision control from



6°C above ambient to 370°C. A built-in anticipatory sensing device results in negligible overshoot in initial heatup. Temperature varia-



Marine Auxiliary Turbine Rotors. Weight Rough Forged—1000 pounds. Diameter of Wheel—20 inches. Diameter of integral forged shaft arm—5 inches. Shaft arm length end to end—5 feet.

Forged Alloy Steel Rotors Sail the Seven Seas . . .

These forged alloy steel rotors will show up at the heart of auxiliary turbines driving boiler feed pumps on large maritime and naval vessels. Rough machined, they weigh slightly less than 1000 pounds each.

Here is visual proof of the versatility of our steel forging production capabilities . . . versatility enabling us to meet the specifications for components required by a wide diversity of industrial and marine machinery.

The same careful quality control procedures as are accorded to turbine rotors weighing 40 tons and more, are standards of operation in producing these relatively small components.

You are safe in placing your parts forgings in our hands. It will pay you well to consult with us on your requirements for any size or shape of steel forgings and castings.

ERIE FORGE & STEEL CORPORATION

ERIE, PENNSYLVANIA

ROLOCK®

FABRICATED ALLOYS

HEAT AND CORROSION RESISTANT

why they are calling us

"THE MUFFLE PEOPLE"

In many years, there have been few occasions when Rolock engineers and constructors were not working on muffles . . . of almost every size and type . . . from "little fellows" to real giants.

Today, this background of experience brings us many of the most important jobs in the field, some examples of which are shown above. Among many important design contributions we have made is an entirely new type of Rolock corrugated wall and roof construction that greatly extends muffle life expectancy. To a number of muffle users Rolock's experts are, indeed, the "muffle people."

Building such muffles is a job that requires experienced engineering design as well as exceptional skills and craftsmanship in handling special alloy fabrication. Rolock offers you both these essentials. A constantly growing file of successful case histories shows important long-range savings to the muffle user. Let us quote on your next job . . . whether it's a standard replacement or one presenting problems to be solved.

SPECIAL SERVICE to users of ENDOTHERMIC GAS GENERATORS

Rolock maintains a prompt repair and replacement service for these gas generator retorts. Our New, improved welded-fabricated Inconel retorts out perform original equipment; offer substantial savings.

FAST DELIVERY

We stock heads, pipes, mesh, catalyst and shell material for immediate service on a full range of large and small sizes. Write or wire.

SALES AND SERVICE REPRESENTATIVES FROM COAST TO COAST

ROLOCK INC., 1362 KINGS HIGHWAY, FAIRFIELD, CONN.

JOB-ENGINEERED for better work
Easier Operation, Lower Cost

2RL30

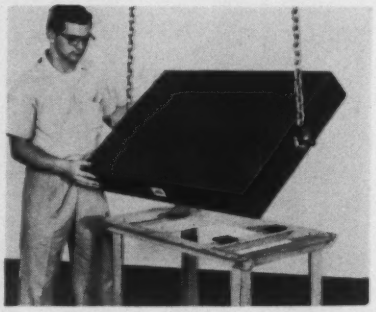
NEW EQUIPMENT

tion thereafter falls within ±3°C. Uniform watt-hour input with consequent even temperatures is maintained. Construction features aim at reliable performance and long life. (Thermo Electric Mfg. Co.)

For more data circle No. 61 on postcard, p. 111

Surface Plates

Reversible black - granite surface plates extend plate life and usefulness, while effecting many economies. The new plates are available in all standard sizes from 8 x 12 in.

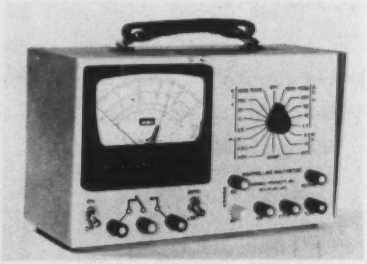


to 48 x 144 in. The two surfaces may have the same finish or a combination of any two standard grades. Removable trunnions make it easy to turn the plates. (The DoAll Co.)

For more data circle No. 62 on postcard, p. 111

Voltage Guard

Measuring only 11 x 6 x 6 in., a controlling multimeter guards virtually any critical voltage, current or resistance. The instrument is a combination of a conventional multimeter, with all the customary



ranges, and a continuous-reading meter-relay with adjustable set points. Ranges of the controlling multimeter are: dc voltage—2.5, 10, 50, 250, and 1000-5000 v; ac voltage—2.5, 10, 50, 250, and

Memo to a Man of "Parts"

The number of different parts made from Roebling High Carbon Specialties, Flat Wire and Spring Steel are close to countless.

Some things you can count on, though, are the consistent dimensional and mechanical uniformity you get with any Roebling High Carbon Specialty. They are the qualities that contribute to speeding *your* production and cutting *your* costs.

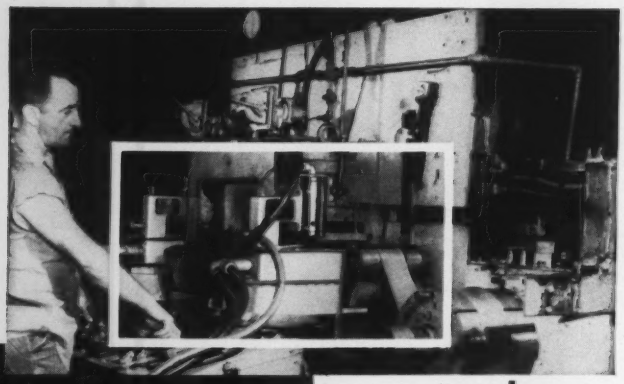
They are high qualities that make for high values. Next time you need flat wire or spring steel, specify Roebling. For information, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, N. J.

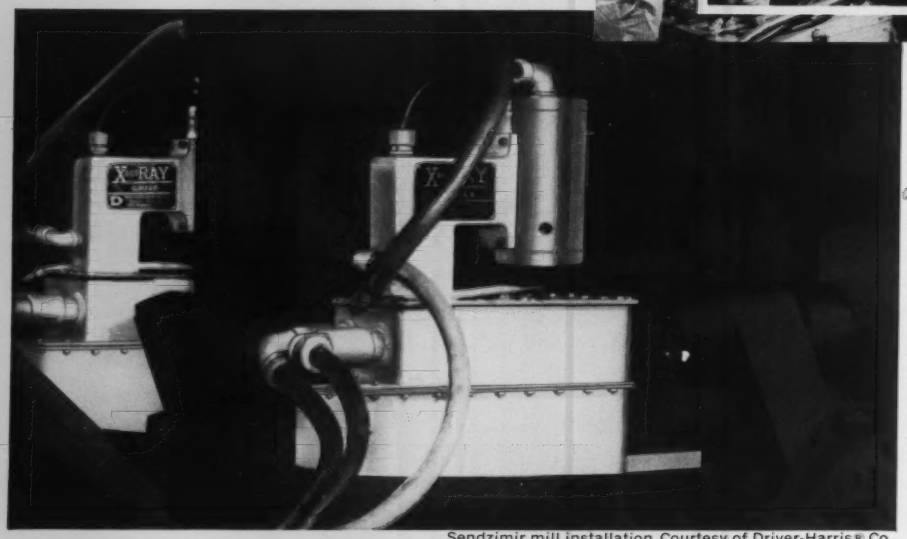
ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division • The Colorado Fuel and Iron Corporation

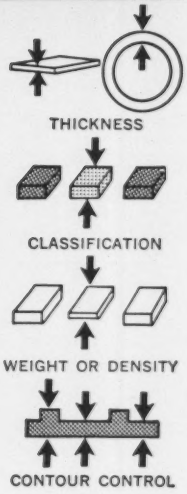
Roebling... Your Product is Better for it

keep an x-ray "eye" on your metal-rolling costs . . .





Sendzimir mill installation Courtesy of Driver-Harris® Co.



XACTRAY NON-CONTACT THICKNESS GAUGES

BOOST YEAR-ROUND PROFITS WITH SPEED AND PRECISION

XactRAY gauges have long been noted for their accuracy in providing absolute thickness measurement of metal on-the-fly. Now they're winning recognition for another great operating characteristic as well—economy—and more and more metal men are discovering why!

Compact and efficient, these gauges require little attention, either for operation or maintenance. And they can be installed practically anywhere in the mill, even close to hot equipment, without upsetting the process line. Mountings are custom built to fit particular requirements.

Continuous XactRAY gauging, coupled with automatic controls and/or alarm devices, saves manhours and millhours...gives measurements to tolerances as close as ±.000010" whether the metal is moving at 6 or 6,000 feet per minute. Material can be put "on-gauge" in fractions of seconds, and the response to thickness deviations is faster than with most other non-contact gauges. This leads to further savings through reduced scrap.

Whatever your measurement...foil, plate or sheet ...ferrous or non-ferrous metals and alloys...you'll find XactRAY can contribute to your own dollar savings. Further economies can be effected through the addition of XactRAYMATIC controls.

Write for the latest literature giving full information on the cost-cutting advantages of XactRAY gauges. It's yours for the asking through your local Weston representative...or write to Weston Instruments Division, Daystrom, Inc., Newark 12, N. J. *In Canada: Daystrom, Ltd., 840 Caledonia Rd., Toronto 19, Ont. Export: Daystrom's International Sales Division, 100 Empire St., Newark 12, N. J.*

DAYSTROM, INCORPORATED
WESTON INSTRUMENTS DIVISION
World leader in measurement and control

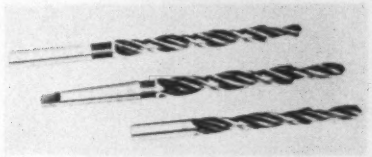
NEW EQUIPMENT

1000 - 5000 v; current — 0/100 microamperes, 0/10 milliamperes, 0/100 milliamperes, and 0/10 amp; resistance—20 megohms in three scales with center-scale values of 12, 1200, and 120,000 ohms. (Assembly Products, Inc.)

For more data circle No. 63 on postcard, p. 111

Standardized Drills

A new line of standardized drills includes three basic operational types. They are: drill chamfer for regular taps, fluteless taps, pipe taps and coil-insert taps; drill counterbore for socket-head cap screws; drill-drill for tap drill and body

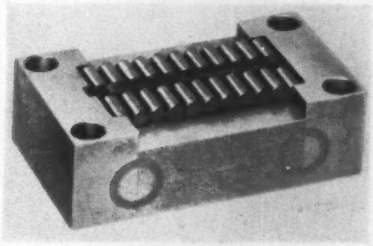


clearance on bolts, studs and screws. The new standards have been developed in all practical sizes and combinations, in three step lengths and three shank styles to suit every conceivable need. (Mohawk Tools, Inc.)

For more data circle No. 64 on postcard, p. 111

Roller-Way Cartridge

A new roller-way cartridge reduces break-away and drag friction in the operation of machine-tool heads and tables. Elimination of drilled holes in the bridge and bet-



ter control of heat treat make possible high static and dynamic load capacities. No screws are used in the assembly, and dirt-catching recesses have been done away with. (Beaver Precision Products, Inc.)

For more data circle No. 65 on postcard, p. 111

NEW FILMS

"Rhapsody of Steel" tells the story of steel from primitive man's discovery of meteoric iron, hurled to earth from space, to modern man's hurling of astronauts back into space. The movie, produced by the U. S. Steel Corp., is an animated cartoon-type of production—set to a symphonic musical score. It's in stereophonic sound. Gary Merrill, star of stage and screen, narrates the film. This wide-screen film is currently being shown in theaters throughout the country.

Film Rental Library—Numerous 16-mm films depict "before" and "after" phases of improvements made on actual jobs in some of America's leading companies. Also available are training and general educational films in various phases of industrial engineering. These films demonstrate how work sim-

New Catalog Describes Latest Developments in Waste and Refuse Storage and Removal

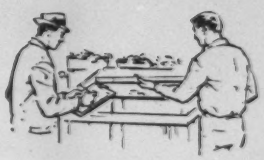
New Techniques Cut Cubic Yard Removal Costs to Record Low

This new 28-page color catalog describes remarkable new developments in waste control and disposal that have, within the last two years, obsoleted many systems now in use. Cubic yard handling costs have been reduced to a point where many firms and municipalities are saving thousands of dollars annually that they were previously spending to operate old-style equipment.

Materials handling and waste disposal are two of the few areas of large potential cost reduction remaining in manufacturing and municipal administration. This new catalog has a bearing on both of these areas of operation.

To get your copy of this new fact-filled catalog, write today.

DEMPSTER BROTHERS
Inc.
DEPT. IA-4 KNOXVILLE 17, TENN.



Dempster Field Engineers, located in all sections of the country, make thousands of cost-finding refuse storage and collection surveys every year, without cost or obligation. If you would like to know your disposal costs, and what—if any—avenues of improvement exist, write today on your letterhead.

28 Page Catalog FREE

Dempster Brothers, Dept. IA-4
Knoxville 17, Tennessee
Please Send New Catalog Brief 160

Name_____
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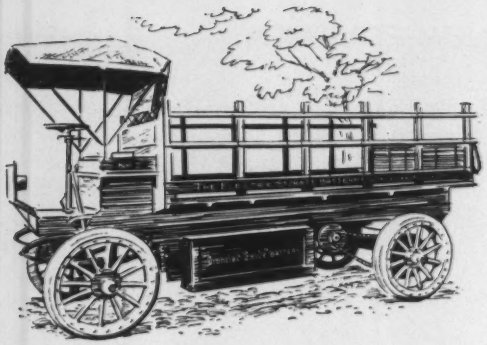
City_____ State_____

LEAD

Sparks A

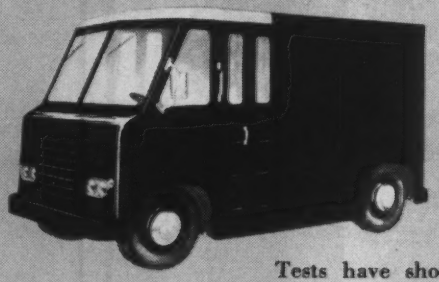
RENAISSANCE



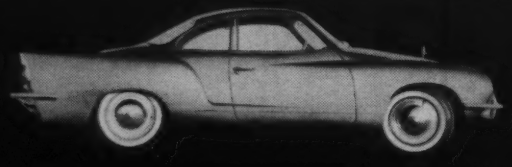
Lead Storage Batteries

Provide *Practical Power*

For Trucks, Cars and Toys

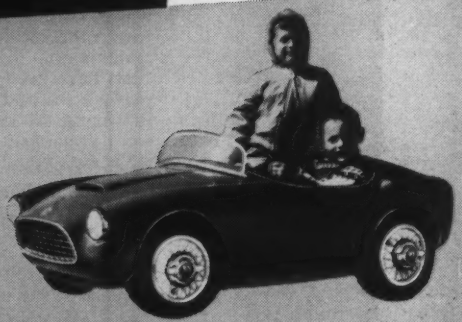


Tests have shown that this Cleveland Vehicle Company's Electric Delivery Truck for stop-go routes saves up to 50% operating costs . . . up to 55% upkeep costs . . . up to 50% insurance costs.



This is the lead-acid battery powered "Charles Town-About." Low operating cost and upkeep make it the ideal "second" car.

Look Ahead With ***LEAD***



"BABY FERRARI" Bimbo Racer 12, exact miniature of the Ferrari Italian sports car, is powered by a standard 12 volt lead auto battery, runs at 5 to 7 miles per hour, climbs 20% grade, operates five to six hours continually before recharge. Built-in recharger uses regular house current, recharges overnight.

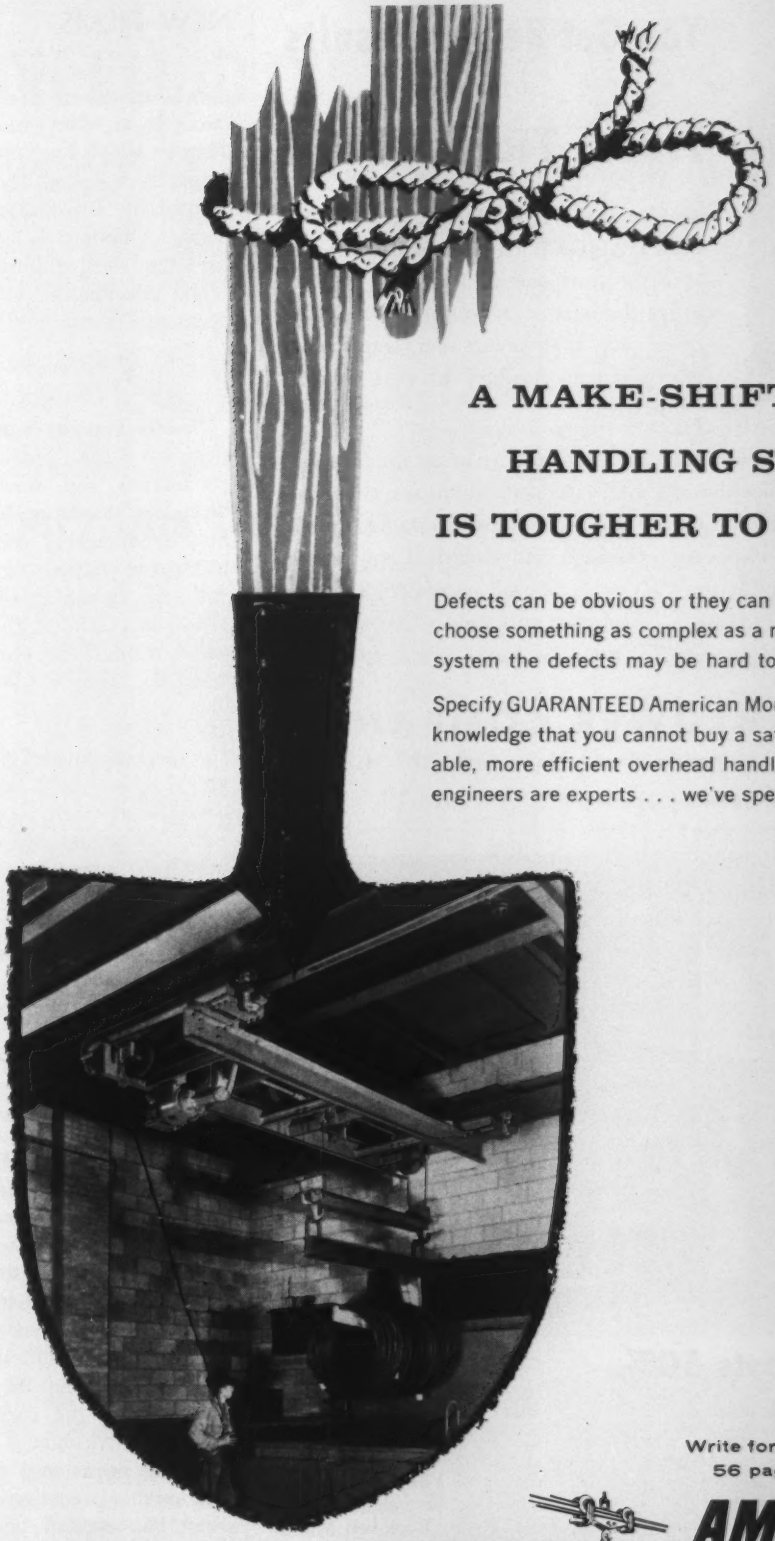
ST. JOSEPH LEAD CO.

ST. JOE

250 PARK AVENUE •
NEW YORK 17, NEW YORK

The Largest Producers of Lead In The United States

PB-149



A MAKE-SHIFT HANDLING SYSTEM IS TOUGHER TO DETECT

Defects can be obvious or they can be hidden. When you choose something as complex as a materials handling system the defects may be hard to recognize.

Specify GUARANTEED American Monorail and relax in the knowledge that you cannot buy a safer, more dependable, more efficient overhead handling system. Our engineers are experts . . . we've specialized for 34 years.

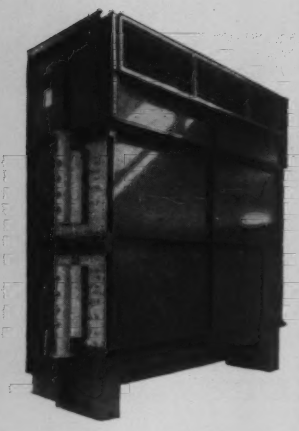
Write for Free Booklet with 56 pages, 99 photos.

ENGINEERED MATERIALS HANDLING

AMERICAN MONORAIL

1103 EAST 200th STREET CLEVELAND 17, OHIO

DIVISIONS: Conveyor Division, Tipp City, Ohio – Canadian Monorail Co., Ltd., Galt, Ont.



You Get Better Results IN HEAT TREATING!

● Use the NIAGARA AERO HEAT EXCHANGER to control the temperature of your quench bath and you remove the heat *at its rate of input,* always quenching at the exact temperature that will give your product the best physical properties.

The Niagara *Aero* Heat Exchanger transfers the heat to atmospheric air by evaporative cooling. It extends your quenching capacity without using extra water. It pays for itself with water savings.

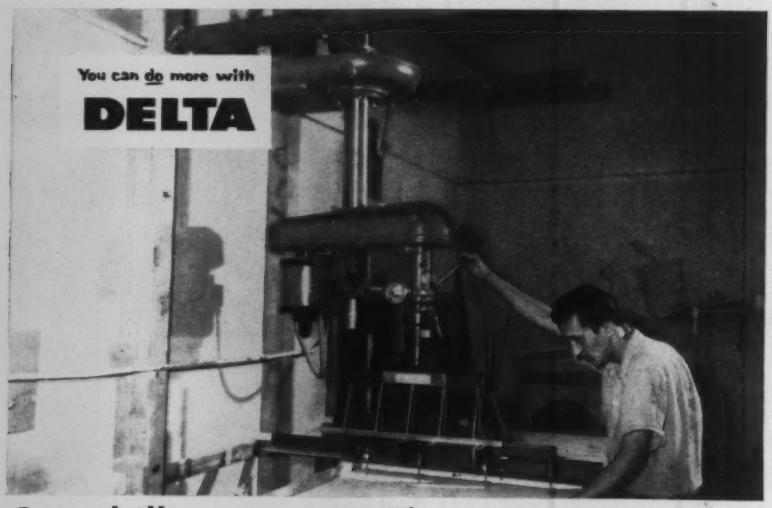
You can cool and hold accurately the temperature of all fluids, gases, air, water, oils, solutions, chemicals for processes and coolants for mechanical and electrical equipment. You get closed system cooling, free from dirt and scale.

Write for Bulletins 120, 124, 132

NIAGARA BLOWER COMPANY

Dept. IA-4, 405 Lexington Ave., New York 17, N. Y.

District Engineers in Principal Cities of U. S. and Canada



Cuts drilling costs 50%

To boost output and increase accuracy, the S & S Visual Company of Brooklyn, N.Y. suspended a standard 17" Delta drill press from an angle iron wall bracket. Use of a Commander multiple spindle drill head permits simultaneous drilling of up to 15 holes in 30" x 60" display panels. Relatively inexpensive installation cost less than $1000, quickly paid for itself by *doubling* production.

This is typical of the way rugged, versatile Delta Industrial Tools are being used in thousands of plants to supplement or replace costly single purpose machines. For free 64-page illustrated booklet of valuable cost-cutting ideas, write: Rockwell Manufacturing Company, Delta Power Tool Division, 640D N. Lexington Ave., Pittsburgh 8, Pa. In Canada, Rockwell Manufacturing Company of Canada, Ltd., Guelph, Ontario.

NEW FILMS

plification results in significant reductions in effort, time and costs. They're ideal for supervisory and employee training. They also instill enthusiasm for methods improvements. A booklet is available which lists the various films along with rental information. Industrial Management Society, 330 S. Wells St., Chicago 6.

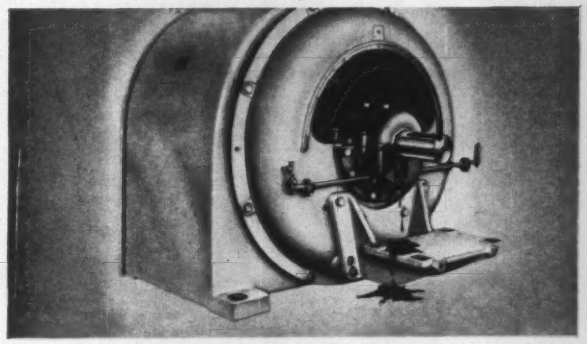
"Silver Threads Amass the Gold" features large production, semi-production and maintenance-type threading machines for pipe. The film is interesting and informative to anyone having anything to do with the threading of pipe, bolts, rods and conduits. 25 min. 16mm, color, sound. The Oster Mfg. Co., 1340 E. 289th St., Wickliffe, O.

"Specialty Steels" is a bright new film in color with a specially written sound score performed by the Zurich, Switzerland, Symphony. In 45 minutes it takes you through major steps in making stainless, tool and special steels. Michael Stumm, Director of Information Services, Crucible Steel Co. of America, Pittsburgh 22, planned the film to tell the specialty-steel story to customers, technical societies and engineering schools.

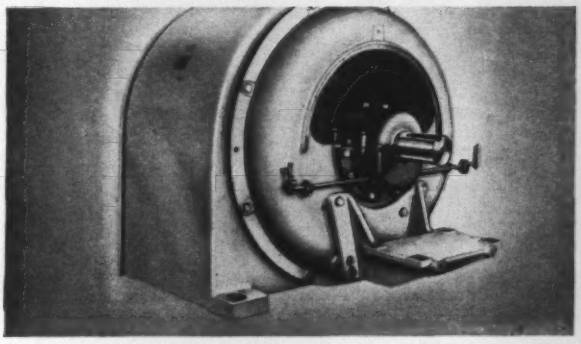
"As Old as the Hills" tells the story of abrasion. It shows how nature, in roaring mountain streams, angry seas and eroded hills, teaches the lesson of abrasion —while depositing natural abrasives for man's first grinding needs. The film goes on to outline man's progress in adapting the lessons and materials of the earth in shaping his own environment to match his growing needs and desires. From the humble beginnings of sandstone, man has created new and better abrasives with which he fashions highly complex machinery. 16mm, color, sound. Norton Co., Worcester 6, Mass.

NON-FLUID OIL

TRADE MARK REGISTERED



Ordinary Oils Drip Out



NON-FLUID OIL Stays in

NON-FLUID OIL does not leak out at the ends of bearings as ordinary oils do, to cause messy, hazardous floors and surroundings.

Where ordinary oils creep or throw onto armatures and cause burnt out windings from oil-soaked insulation, NON-FLUID OIL remains in vital motor bearings and provides perfect protective lubrication until entirely consumed.

For motors of ball and roller bearing types, heavier grades of NON-FLUID OIL offer additional advantages, depending upon the method of application and temperature conditions encountered.

For safe, cool, long-lasting motors that cost less to maintain, write for NON-FLUID OIL Bulletin No. 504 and free testing sample.

NEW YORK & NEW JERSEY LUBRICANT COMPANY

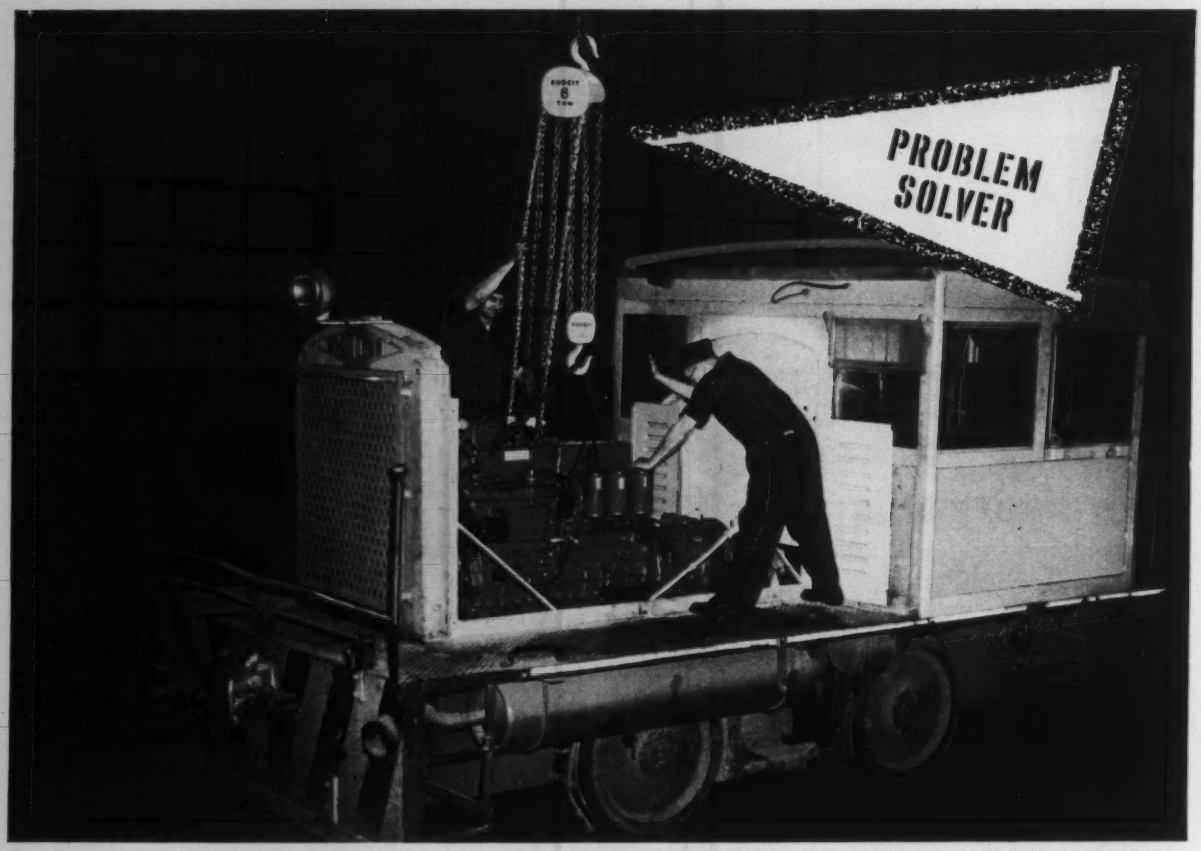
292 MADISON AVE., NEW YORK 17, N. Y.
WORKS: NEWARK, N. J.

WAREHOUSES

Birmingham, Ala.	Charlotte, N. C.	Springfield, Mass.	Providence, R. I.
Atlanta, Ga.	Greenville, S. C.	Greensboro, N. C.	St. Louis, Mo.
Columbus, Ga.	Chicago, Ill.	Detroit, Mich.	

NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture.

Quality SPRINGS,
SMALL STAMPINGS and WIRE FORMS
delivered as specified
You get good spring performance when U. S. Steel Wire Spring is on the job. Specifications are met exactly. The reason is that our facilities are geared to produce only springs, wire forms and small stampings of high carbon steel. That's our business and our many customers will tell you "we know our business." But why not find out for yourself?
No order too large or too small!
The U. S. STEEL WIRE SPRING Co.
7800 FINNEY AVE • MICHIGAN 1-6315
CLEVELAND 5, OHIO



"BACKBREAKERS" wiped out by Budgit® Chain Blocks

Budgit Aluminum Army Type Chain Block. Integral push and hand-geared trolleys are adjustable to fit I-beams in a number of sizes. Low head-room design. Capacities: ¼ to 10 tons.
Budgit Aluminum Chain Block. Light in weight but tough. Can be carried to the job, hung up and operated by one man. Spark and corrosion resistant models. Capacities: ¼ to 2 tons. Hi-Cap* models from 3 to 10 tons.
Budgit Differential Hoist. Low-priced lifting tool for occasional use where high efficiency isn't essential. Light and compact. Capacities: ¼, ½ and 1 ton.
Tugit* Lever-Operated Hoist. Light, compact, portable. Easy to operate even in close quarters at any angle. Fine for maintenance. Capacities: ¾ to 3 tons.

* *REGISTERED TRADENAMES* 60 C-1

Eliminate tough lifting and plant maintenance ceases to be a costly muscle-aching job. A large midwestern heavy machinery manufacturer found this only too true. So now Budgit Aluminum Chain Blocks in various capacities are proving to be the perfect answer to countless lifting problems.

These lightweight hoists are easy to get to the job — easy to rig and operate at any angle. These features alone have won wide favor among the maintenance men. For instance, troublesome occasional jobs — repairing furnaces, dismantling machinery, handling large pipe, motors or valves — demand shifting as well as lifting.

Budgit Chain Blocks are also solving handling problems at numerous metalworking machines. Here the number of lifts per day are few but accurate "spotting" of heavy loads is now being done without backbreaking hand chain pull.

Backsaving Budgit Chain Blocks can cut your maintenance costs and also boost your production efficiency. Ask your nearby Shaw-Box Distributors to help you select the types and capacities best suited to your needs. Or write for Bulletin 15025-1C.

MANNING MAXWELL & MOORE INC. M&M TRADE MARK

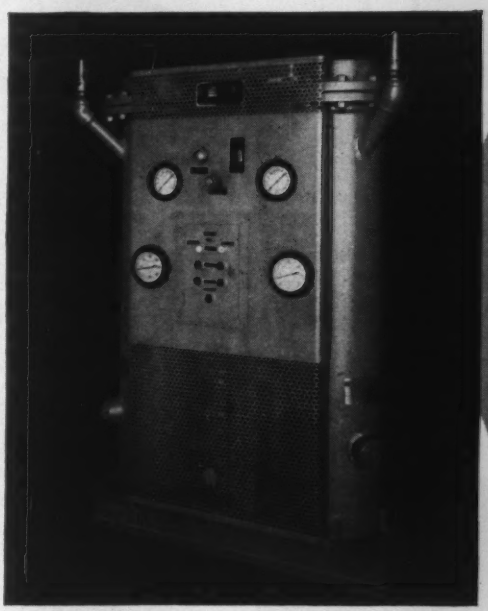
BUDGIT CHAIN BLOCKS
A product of
MANNING, MAXWELL & MOORE, INC.
Shaw-Box Crane & Hoist Division • Muskegon, Michigan
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

For precise atmosphere control in metalworking . . .

KEMP ORIAD DESICCANT DRYERS

give you 3 big advantages!

- In drying compressed air for air tools
- Drying hydrogen, helium, nitrogen
- Purifying furnace gases
- Drying instrument air
- Metal treating and brazing
- Drying air for paint sprays
- Testing equipment



1 Complete reactivation

Unequalled extra-drying power is assured, with the unique 3-zone embedded heater in every Kemp Oriad Desiccant Dryer. Reactivation is always complete and uniform in drying air, gases or liquids.

2 Complete temperature control

Thermostatic control conserves heat input . . . keeps ideal temperatures for the highest operating efficiency at the lowest operating costs. The entire network is protected by an alarm circuit.

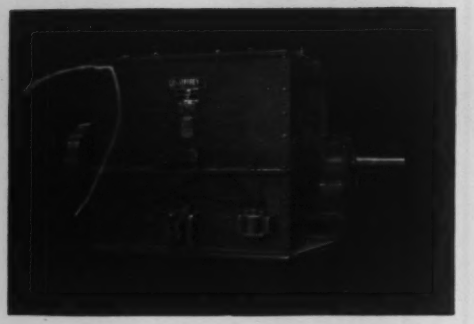
3 Complete automatic operation

Once the program timer is set, everything is regulated automatically. Drying takes place with the least loss in pressure, the lowest cost in maintenance and operation. For further information, write for Bulletin D-103... or call the man from Kemp listed in the Chemical Engineering Catalog.

It always pays to come to **KEMP** OF BALTIMORE

THE C. M. KEMP MANUFACTURING COMPANY
405 E. Oliver Street • Baltimore 2, Maryland

Jeffrey Pulverizer crushes fluxstone fine for efficient sintering



The Jeffrey Type B Pulverizer has many advantages in crushing fluxstone for sintering operations. It crushes *fine* – standard 3/8", or 1/8", when required. This is possible since the material goes through several changes in direction and several hammer contacts before it reaches the screen bars.

This unit is reversible, designed for heavy duty work, is dust-tight, and has hydraulic adjustments. Power requirements are less than with other units, since most of the work on the material is done before the material reaches the screen bars.

Fluxstone is but one of hundreds of materials which can be efficiently reduced with Jeffrey Crushers... from alum and asbestos to rock and slag. For complete information check your nearest Jeffrey sales engineer. The Jeffrey Manufacturing Company, 925 North Fourth Street, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT... POWER TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

The Iron Age Summary

Demand for Steel at Crossroads

Orders for steel will have to undergo a change if expected record production is to be reached this year.

But inventories are so low that spot orders by even big users are causing some encouragement to the steel mills.

■ April will be a time of decision for the steel industry.

Unless the present rate of orders for steel is reversed by new demands for steel, the industry may have to make a further downward revision of estimates for the year.

To point out the critical period ahead, these conflicting forces are at work:

On the Negative Side:

Automotive—In the face of high stocks of unsold cars, automakers are still scheduling high rates of production through April. Unless there is a major surge in auto buying, a long period of downtime and a resulting low ordering of steel are inevitable this summer.

Construction and Capital Spending—To date, the optimistic surveys of capital spending have not been translated into actual steel orders. At the moment, heavy steels used in expansion programs are among the weakest products.

Other Consumer Durables—Many makers of consumer durables have cut back heavily on steel orders. Estimates of business conditions are contradictory, but the steel order picture is doubtful.

On the Positive Side:

Cancellations have slowed in recent weeks and some spot ordering has materialized in many steel sales offices.

The advent of warm weather is expected to stimulate auto sales and launch many planned expansion programs.

Inventory Factor—The spot buying may have deeper significance. It indicates that many major users have cut back inventories to the minimum. Rates of ordering, which have been below consumption, may pick up of necessity.

Steel warehouses expect that April will see the end of the sales dropoff. The general tone from the service centers is hopeful and talk of a June recovery, possibly a relatively strong upsurge, is frequent.

Second Guessing—The big concern is that the new questions of demand may go beyond the inventory adjustment which caused the earlier revision of year-long business estimates. At that time, it became clear that industry would not build up inventories to the original estimate. This wiped out probably 5 to 7 million tons from the annual estimate for 1960.

Now, the concern is over the industries that use steel. For many, demand for their products has not firmed as expected. This has caused the added concern over summer steel demand.

Up or Down? — For example, cautious ordering by the auto industry is no more than 40 pct of normal tonnage for June. But with inventories of steel at rock-bottom, any revision could mean a sharp change in the entire automotive ordering picture.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,447	2,527	2,654	2,641
Ingot Index				
(1947-1949=100)	152.3	157.3	165.2	164.4
Operating Rates				
North East Coast	85.0	87.0	87.0	97.0
Buffalo	92.0	98.0	103.0	95.0
Pittsburgh	85.0	86.0	97.0	96.0
Youngstown	76.0	79.0	86.0	89.0
Cleveland	95.0	98.0	100.0	97.0
Detroit	98.0	103.0	104.0	97.0
Chicago	90.0	95.0	98.0	94.0
Cincinnati	99.0	101.0	100.0	79.0
St. Louis	99.0	101.0	100.0	98.0
South	82.0	84.0	87.0	94.0
West	71.0	75.0	82.0	95.0
U. S. Rate	85.9	88.7	93.1	93.3

*Revised
Source: American Iron And Steel Institute

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$33.17	$33.17	$33.83	$36.50
No. 2 bundles	$22.50*	$22.33	$21.83	$24.17
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	31.50
Lead, St. Louis	11.80	11.80	11.80	10.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	99.625	99.75	100.625	103.00
Zinc, E. St. Louis	13.00	13.00	13.00	11.00

Press Leasing To Be Sales Gun

Press maker joins with Nationwide Leasing Corp. Verson Allsteel Press Co. will supply knowhow and sales force.

A news leak on the agreement has already triggered dozens of inquiries from prospective lessees.

■ Verson Allsteel Press Co. this week signed a contract with Nationwide Leasing Corp. aimed at making leasing the number one sales tool of the big press manufacturer.

Under the blanket leasing agreement, Nationwide will handle all Verson's leasing of presses. Verson officials believe the contract will boost leasing from less than 5 pct of the company's annual business to 10 to 20 pct in the first year.

Verson, booked full through August, is setting aside 10 pct of output in the April-August period for immediate lease. It is installing $1 million in new manufacturing equipment to handle the anticipated business surge.

New Emphasis—Capital equipment leasing isn't new. Verson began leasing in 1952. Other press and tool manufacturers have leased equipment, sometimes using outside capital. But leasing was usually a conditional sale lease, with the equipment manufacturer putting up the capital. Verson now supplies knowhow and a sales force. Nationwide provides the cash. All Verson's equipment line comes under the leasing agreement.

Nationwide's primary role in the agreement: "Money," says a Verson company officer. "For the first time we've provided a major pool of cash so that press leasing can really put on steam. We're in a rising economy. The small and medium metalworking shops, job stampers for example, will need new equipment but they'll be short on cash. With leasing we can get the new equipment into their shops when they need it."

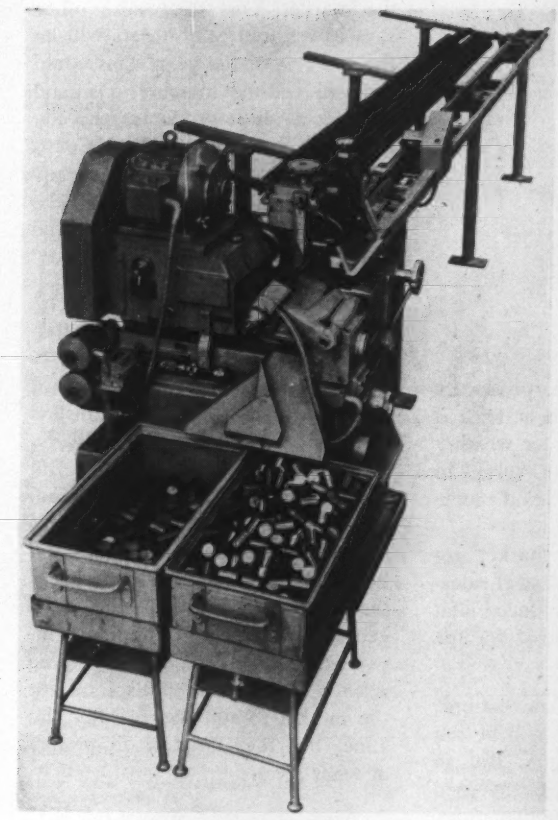
Capital Release — Verson vice president M. D. Verson, comments, "Until now leasing has been the stepchild. A kind of court of last resort. We plan to make it both a sales tool and a means of boosting our own working capital."

Lease Terms—Present planning calls for three and five year leases, though special leases for heavy equipment may extend to 10-15 years. These aren't conditional sales, it has been pointed out. The equipment is purchased by Nationwide after a Verson customer has indicated to Verson salesmen that he wants to write a lease.

Customers are interested. No official announcement was made prior to this week, but leaks in the sales department have already brought several dozen inquiries. A Verson sales official reports, "We just leased $190,000 worth of presses to one customer. Without leasing, he told us, we didn't have a chance of closing a sale."

Leasing Up — The Verson move into combination leasing is indicative of the surging strength of leasing generally. Nationwide Leasing points out that leasing is gaining at a 30 pct per year rate, with an estimated $42 million in machine tools on lease to U. S. industry at the beginning of this year.

LEASE AGREEMENT SIGNED: Melvin D. Verson (left), vice president, administration, Verson Allsteel Press Co., signs new leasing contract with Robert Sheridan, president, Nationwide Leasing Company.



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Will Steel Sales Snap Back?

An increase in the number of rush orders may indicate steel users cut back too far.

At any rate, the deluge of cancellations has finally all but stopped.

■ The steel market is acting like a ball on the end of a rubber string. The rate of the fall has been slowed. And there are even signs of rebounding. A small tug is enough to move the market up or down.

Filling Holes—Cancellations and cutbacks have nearly stopped in the **Cleveland** area. It also appears that some customers may have cut back too fast and too far. They've had to scramble to fill holes in their inventories. As a result, users are taking a second look at inventories; building them to a more balanced and workable condition.

A similar reaction is taking place in the other parts of the **Midwest.** Several mills in the **Chicago** district report a flurry of rush orders for sheet and strip. And steel salesmen are getting the impression that purchasing agents would like to rebuild inventories but are being restrained by a wait-and-see attitude adopted by management.

Warehouses Hopeful — At least one major steel service center chain predicts an increase in sales for April. While this belief still isn't widespread, talk of a June recovery is heard with increasing frequency. And the feeling is that it may be fairly strong.

If nothing else, seasonal influences will be felt soon, producers say. And this will have at least a leveling effect. Late winter weather has delayed the spring surge in construction, pipeline, and merchant products.

Even so, no great market resurgence is forecast. But steel salesmen are just about convinced that the worst is over—at least for the present.

Sheet and Strip—Cancellations, particularly automotive, will be felt in April, May and June. But in many cases, the tonnages released have been picked up by other users. As a result, mills don't expect to fill the full force of the cancellations. Reports from **Pittsburgh** indicate full schedules are projected for May and June on cold-rolled products. Hot-rolled operations, however, are expected to fall to 75 pct of capacity. **Cleveland** mills are quoting delivery for the last half of May for cold-rolled sheet and strip, but hot-rolled products are easier by 2 to 3 weeks. From **Detroit** comes an indication of what support the auto industry will give the market: One steel sales office says it was told May orders will be the smallest of the year. This could indicate a June increase. Demand for special sheet products generally continues good on the **East Coast.** Light-gage galvanized is already booked through June, although the demand for heavy gage galvanized is not quite as strong as this.

Bars—Signs of strength aren't as much in evidence as with flat-rolled products. Most districts report space left on April books for hot-rolled bars. And cold-finished bars are available for May delivery, if they have to be booked. But there are exceptions. In **Cleveland,** for instance, standard sizes are available almost as an off-the-shelf item. The feeling in **Pittsburgh** is that customers have joined in a general movement to liquidate inventories. And some are holding up release orders. The mills look for the market to stabilize in May and June, but they hesitate to predict at what level.

Wire—The long, drawn out winter has hurt this market. Customers are watching inventories closely, say **East Coast** producers. Most new orders are to balance out supplies. But construction products have started to move a little, according to **Pittsburgh** mills. However, few users see a need to place orders very far in advance. In most areas, mills can promise delivery within 10 days to 2 weeks.

Plates and Shapes—New orders from users are slow coming in. Warehouses are well stocked and have little reason to do much ordering until their business improves. Imports continue to hurt, but the general buying level is down. Mills on the **East Coast** are running at below-normal levels.

Stainless — Mills are carrying pretty large supplies of finished and semi-finished stainless, according to **Detroit** reports. And mills are practically offering warehouse delivery. Users aren't pinched for supplies and the situation isn't likely to change.

PURCHASING AGENT'S CHECKLIST

What's the steel market outlook? —an IRON AGE interview with L. S. Hamaker, asst. vice president-sales, Republic Steel Co. P. 50

Two steel companies announce colored stainless steel. P. 54

Machine tool sales showed some improvement in February, but builders don't expect a big sales spurt soon. P. 75

COMPARISON OF PRICES

(Effective April 5, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Apr. 5 1960	Mar. 29 1960	Mar. 8 1960	Apr. 7 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10**	14.10**	14.10**	13.55
Stain'l's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	April 5 1960	Mar. 29 1960	Mar. 8 1960	April 7 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$34.50	$34.50	$34.50	$39.50
No. 1 steel, Phila. area	34.50	34.50	35.50	34.50
No. 1 steel, Chicago	30.50	30.50	31.50	35.50
No. 1 bundles, Detroit	30.50	30.50	31.50	32.50
Low phos., Youngstown	38.50	38.50	38.50	41.50
No. 1 mach'y cast, Pittsburgh	52.50	52.50	52.50	49.50
No. 1 mach'y cast, Phila.	51.50	51.50	51.50	49.50
No. 1 mach'y cast, Chicago	52.50	52.50	53.50	54.50
Steel Scrap Composite (per gross ton)				
No. 1 hvy. melting scrap	$33.17	$33.17	$33.83	$36.50
No. 2 bundles	22.50*	22.33	21.83	24.17
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.75-15.50	$14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	31.50
Copper, Lake, Conn.	33.00	33.00	33.00	31.50
Tin, Straits, N. Y.	99.625*	100.25	100.00	103.00
Zinc, East St. Louis	13.00	13.00	13.00	11.00
Lead, St. Louis	11.80	11.80	11.80	10.80
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Minor Mill Buying Steadies Market

Existing price levels are backed up by small mill purchases in most areas.

In Coastal areas, export continues to hold up the market. Factory lists hold gains.

■ The market continued to hang-fire over the week, as mills made small purchases at existing price levels, but with predictions of reduced buying for the immediate future. Industrial lists varied, indicating the uncertain market outlook. But the market held, rather than repeating any of the sharp drops of recent weeks.

At least a few notes confirmed mild dealer optimism: In a few areas, electric furnace grades made mild gains and held at current levels in most other areas. A few electric furnace buyers placed orders, though they were small orders. Export orders began to appear in mild quantity, even if at fairly low price levels.

In a few areas, new factory lists bid during the week continued to show the mild price gains that were scored in the final week of last month.

While actual tonnages committed for export have been light, this seems to be at least a minor factor in holding prices in a number of areas. This has been noted for the first time in the Midwest.

Export tonnages began moving via the St. Lawrence Seaway in July of last year from Chicago shippers. This year, however, dealers appear to be earmarking scrap for export in a number of Lakes cities.

Pittsburgh—Market here remains quiet as brokers hesitate to make commitments at current prices and mills show no interest in paying higher prices. Most signs still point to weakness. A fringe-of-the-district mill bought small tonnage of No. 1 hvy melting at $35 to the dealer and No. 2 hvy melting at $30 to the dealer. Both prices were down $1 from last month. Supply of some grades is tightening. No. 2 bundles are moving slowly on old orders.

Chicago—Market continues slow, with minor price fluctuations. No. 1 factory bundles were incorrectly quoted in issue of March 31 at $35-36. Correct price should have been $36-37. This price continues in effect following sales of two new factory bundle lists in this price range. Foundry grades show no marked improvement, but consumer interest appears to be reviving. A major mill reduced its industrial hvy melting price to $33.

Philadelphia—With the domestic market inactive, about 75 pct of the tonnage is moving for export. Between three and five boats will be loaded this month. There is not enough tonnage moving to local mills to change prices. Some foundry grades dropped $1 a ton in limited buying.

New York — Market remains pretty much as it has been for the past 30 days. Export buying is holding up prices. But keen competition for export business and continued lack of domestic interest is holding prices down.

Detroit—Market holding steady here. There was no real break, either up or down, on the April industrial lists. Local opinion holds that the Detroit market is holding because of Canadian orders for No. 1 busheling and because of some export shipments, reportedly into the European market.

Cleveland—The few small orders coming from mills are not enough to relieve the pressure of the tonnage overhanging the local market. No large orders are in sight, but could originate if blast furnaces are reduced.

St. Louis—Despite a $1 slip in melting steel prices, industrial and railroad offerings are keeping a lid on dealer material in this area. This willingness to hold at the dealer level has injected an easier tone into the entire market.

Cincinnati — Unprepared scrap sources were reported drying up because of low prices in the area. At the same time, production lists are expected to stay in the district, moving at prices of about $35 on track.

Birmingham—Cast is only source of action in local market, with open-hearth and electric furnace consumers inactive. A major electric furnace released shipments April 1, but made no new purchases. One ship is due at Mobile this week, others at South Atlantic and Gulf ports. Reroller Rail has been dropped from the listing, because of no local consumers.

Buffalo—New purchases of steelmaking grades were made during the week at existing price levels. Opening of the Lakes shipping season will boost scrap supplies.

Boston—Local market continues quiet without important price changes. A few export and domestic orders are being placed.

West Coast—No. 1 hvy melting dropped $1 per ton at San Francisco and $3 at Los Angeles. Mills are taking minimum tonnages only. Exporters report that orders are easy to fill at current price levels.

Houston—Local brokers showing interest in mill activity in East Texas, though market is holding level. An East Texas mill extended buying into April with a $1.50 springboard offer on mill grades. This still fails to match local mill prices.

SCRAP PRICES

(Effective April 5, 1960)

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	36.00 to 37.00
No. 1 factory bundles	40.00 to 41.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	22.00 to 23.00
Low phos. punch'gs plate	41.00 to 42.00
Heavy turnings	30.00 to 31.00
No. 1 RR hvy. melting	38.00 to 39.00
Scrap rails, random lgth.	53.00 to 54.00
Rails 2 ft and under	58.00 to 59.00
RR specialties	45.00 to 46.00
No. 1 machinery cast.	51.00 to 52.00
Cupola cast.	45.00 to 46.00
Heavy breakable cast.	43.00 to 44.00
Stainless	
18-8 bundles and solids	220.00 to 225.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	125.00 to 130.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	31.00 to 32.00
No. 1 factory bundles	36.00 to 37.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	43.00 to 44.00
Low phos. punch'gs plate, ¼ in. and heavier	39.00 to 40.00
Low phos. 2 ft and under	37.00 to 38.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rails, random lgth.	45.00 to 46.00
Rerolling rails	54.00 to 55.00
Rails 2 ft and under	52.00 to 53.00
Angles and splice bars	44.00 to 45.00
RR steel car axles	50.00 to 51.00
RR couplers and knuckles	41.00 to 42.00
No. 1 machinery cast.	52.00 to 53.00
Cupola cast.	44.00 to 45.00
Cast iron wheels	39.00 to 40.00
Malleable	52.00 to 53.00
Stove plate	41.00 to 42.00
Steel car wheels	42.00 to 43.00
Stainless	
18-8 bundles and solids	215.00 to 220.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	115.00 to 120.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	19.00 to 20.00
Mixed bor. short turn.	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Shoveling turnings	22.00 to 23.00
Clean cast. chem. borings	25.00 to 26.00
Low phos. 5 ft and under	37.00 to 38.00
Low phos. 2 ft punch'gs	40.00 to 41.00
Elec. furnace bundles	37.00 to 38.00
Heavy turnings	28.00 to 29.00
RR specialties	43.00 to 44.00
Rails, 18 in. and under	58.00 to 60.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	42.00 to 43.00
Cast iron car wheels	45.00 to 46.00
Malleable	55.00 to 56.00
No. 1 machinery cast.	51.00 to 52.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. 18 in. and under	40.00 to 41.00
Rails, random length	48.00 to 49.00
Rails, 18 in. and under	53.00 to 54.00
No. 1 cupola cast.	41.00 to 42.00
Hvy. breakable cast.	36.00 to 37.00
Drop broken cast.	50.00 to 51.00

Youngstown

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	20.00 to 21.00
Low phos. plate	38.00 to 39.00

Cleveland

No. 1 hvy. melting	$33.50 to $34.50
No. 2 hvy. melting	23.50 to 24.50
No. 1 dealer bundles	33.50 to 34.50
No. 1 factory bundles	37.50 to 38.50
No. 2 bundles	19.00 to 20.00
No. 1 busheling	33.50 to 34.50
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Cut structural & plates, 2 ft & under	40.00 to 41.00
Drop forge flashings	33.50 to 34.50
Low phos. punch'gs plate	34.50 to 35.50
Foundry steel, 2 ft & under	34.00 to 35.00
No. 1 RR hvy. melting	37.00 to 38.00
Rails 2 ft and under	57.00 to 58.00
Rails 18 in. and under	61.00 to 62.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	55.00 to 56.00
No. 1 machinery cast.	55.00 to 56.00
Stove plate	48.00 to 49.00
Malleable	52.00 to 53.00
Stainless	
18-8 bundles	210.00 to 220.00
18-8 turnings	90.00 to 100.00
430 bundles	105.00 to 115.00

Buffalo

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 busheling	30.00 to 31.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	16.00 to 17.00
Low phos. plate	40.00 to 41.00
Structurals and plate, 2 ft and under	40.00 to 41.00
Scrap rails, random lgth.	38.00 to 39.00
Rails 2 ft and under	48.00 to 49.00
No. 1 machinery cast.	48.00 to 49.00
No. 1 cupola cast.	45.00 to 46.00

St. Louis

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	31.00 to 32.00
Foundry steel, 2 ft	34.00 to 35.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	19.00 to 20.00
No. 1 RR hvy. melting	37.00 to 38.00
Rails, random lengths	43.00 to 44.00
Rails, 18 in. and under	47.00 to 48.00
RR specialties	43.00 to 44.00
Cupola cast.	47.00 to 48.00
Heavy breakable cast.	35.00 to 36.00
Stove plate	40.00 to 41.00
Cast iron car wheels	35.00 to 36.00
Rerolling rails	54.00 to 55.00
Unstripped motor blocks	38.00 to 39.00

Birmingham

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	21.00 to 22.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	12.00 to 13.00
Electric furnace bundles	35.00 to 36.00
Elec. furnace, 3 ft & under	33.00 to 34.00
Bar crops and plate	41.00 to 42.00
Structural and plate, 2 ft	40.00 to 41.00
No. 1 RR hvy. melting	33.00 to 34.00
Scrap rails, random lgth.	45.00 to 46.00
Rails, 18 in. and under	50.00 to 51.00
Angles and splice bars	42.00 to 43.00
No. 1 cupola cast.	48.00 to 49.00
Stove plate	48.00 to 49.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	38.00 to 39.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	22.00 to 23.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	9.00 to 10.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	11.00 to 12.00
Clean cast. chem. borings	20.00 to 21.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 prepared solids	195.00 to 200.00
18-8 turnings	85.00 to 90.00
430 prepared solids	80.00 to 85.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	16.00 to 17.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	28.00 to 29.00
Drop forge flashings	28.00 to 29.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Heavy breakable cast.	37.00 to 38.00
Mixed cupola cast.	43.00 to 44.00
Automotive cast.	49.00 to 50.00
Stainless	
18-8 bundles and solids	195.00 to 200.00
18-8 turnings	65.00 to 70.00
430 bundles and solids	80.00 to 85.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	13.00 to 14.00
No. 1 busheling	27.00 to 28.00
Machine shop turn.	6.00 to 7.00
Shoveling turnings	9.00 to 10.00
Clean cast. chem. borings	14.00 to 15.00
No. 1 machinery cast.	39.00 to 40.00
Mixed cupola cast.	32.00 to 33.00
Heavy breakable cast.	30.00 to 31.00

San Francisco

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	30.00
No. 1 dealer bundles	30.00
No. 2 bundles	20.00
Machine shop turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
No. 1 cupola cast.	44.00

Los Angeles

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	17.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	15.00 to 16.00
Cast iron boring	15.00 to 16.00
Elec. furn. 1 ft. and under (foundry)	42.00
No. 1 cupola cast.	38.00 to 39.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.25
No. 2 hvy. melting	28.25
No. 1 dealer bundles	32.25
No. 2 bundles	20.00
Mixed steel scrap	24.25
Bush., new fact., prep'd.	32.25
Bush., new fact., unprep'd	26.25
Machine shop turn.	14.00
Short steel turn.	17.00
Mixed bor. and turn.	13.00
Cast scrap	$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 2 bundles	19.00
Machine shop turn.	16.00
Shoveling turnings	20.00
Cut structural plate 2 ft & under	$43.50 to 44.50
Unstripped motor blocks	32.00 to 33.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	29.00 to 30.00

New Merger Action Follows Pattern

Dept. of Justice move against Alcoa on Rome Cable merger follows a pattern of anti-merger moves.

Aim apparently is to block primary metals producers from acquiring fabricators.

▪ The U. S. Dept. of Justice has moved against another primary metals producer that had taken the merger road to get deeper into fabricating and closer to end products.

The latest target is Aluminum Co. of America for its acquisition last March of the Rome Cable Co., Rome, N. Y.

Industry Reaction — The initial reaction of some primary metals people: There isn't much doubt now of the government's out-and-out opposition to primary metals producers merging with fabricators to get more into working and forming.

Some previous actions by the Justice Dept. and the Federal Trade Commission had sent attorneys and top management of some primary metals companies scurrying into conference. Earlier this year, they began to fear that some of the cases were related and formed a pattern. (The IRON AGE, Feb. 25, 1960, P. 25) Now their fears are apparently confirmed.

Basis of Action—Justice Dept. wants Alcoa to divest itself of Rome Cable because the acquisition "may substantially lessen competition and tend to the creation of monopoly because competition in the production and sale of various wire and cable products, conduit and cable accessories may be substantially reduced." And it says "Alcoa's competitive advantage both as an aluminum supplier and as a wire and cable manufacturer, may be enhanced to the detriment of competition."

The complaint notes further that Alcoa's sales of wire, cable and conduit in 1958 exceeded $32 million. Rome, when acquired last March, was selling $40 million annually of cable, wire and conduit, of both copper and aluminum.

Alcoa Defends—Alcoa says its acquisition of Rome Cable was lawful and says courts will uphold its position. The suit to force Alcoa to divest itself of Rome was announced after preliminary discussions last week between company and government officials.

At that time, the possibility of a similar action involving Rea Magnet Wire Co. was mentioned, but no move has been made. The government has not moved yet to block Alcoa's acquisition of Cupples Products Corp. of St. Louis. Cupples employs 800, makes windows, doors, and other building products.

Key Case — The Rome Cable case shapes up as the most important test of moves by basic producers to extend the range of their operations.

The company hinted that it plans to base its defense on "improved service to the rapidly growing electrical industry," made possible by the merger. Alcoa notes specifically the improved research and development program, and the more extensive line of products available from a single source.

Others on File—In probing for any trends against mergers in government thinking, the similarity of the charges in some recent government cases is apparent.

Reynolds Metals Co. was ordered to restore its purchase of Arrow Brands, Inc., an independent florist foilmaker, because the acquisition would lessen competition.

Kennecott Copper Co. is being pressed by Justice Dept. on its purchase of the Okonite Co., a copper wire and cable maker. The government contends, among other things, the effect "may be substantially to lessen competition or tend to create a monopoly."

Tin prices for the week: March 30 — 99.875; March 31 — 99.75; April 1 — 99.625; April 4—99.625; April 5—99.50*.
*Estimate.

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in FEBRUARY based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper, del'd Conn. Valley	33.00
Copper, Lake	33.00
Straits, Tin, New York	100.09
Zinc, E. St. Louis	12.90
Lead, St. Louis	11.80
Aluminum ingot	28.10

Note: Quotations are on going prices

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	33.00	35.00	3/11/60
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/6/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 147.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.038	.048–.061	.077–.096	.136–.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1–17	44.7–46.2	53.2–60.8
18–32	45.2–46.8	57.7–79.9
33–38	48.8–51.4	83.3–94.5
39–44	58.7–62.4	99.9–121.0

Screw Machine Stock—2011-T-3

Size"	¼	⅜–⅝	¾–1	1¼–1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250–2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Muntz Metal	53.20	.....	48.26	.....
Comm. Bz.	56.17	56.46	55.86	59.48
Mang. Bz.	58.86	.....	52.21	.....
Phos. Bz. 5%	77.44	.....	78.19	.....

Free Cutting Brass Rod 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; Bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.... $ 1.31
Cobalt, 97-99% (per lb).... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 29.95 to 36.95
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz. $2.25
Iridium, dollars per troy oz.... $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $213 to $215
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz.. $24 to $26
Platinum, dollars per troy oz.. $82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 29.25
- No. 120 ..... 28.25
- No. 123 ..... 27.25

80-10-10 ingot
- No. 305 ..... 33.75
- No. 315 ..... 31.50

88-10-2 ingot
- No. 210 ..... 42.00
- No. 215 ..... 38.75
- No. 245 ..... 34.00

Yellow ingot
- No. 405 ..... 23.75

Manganese bronze
- No. 421 ..... 28.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 25.75-26.00
- 0.60 copper max. 25.50-25.75

Piston alloys (No. 132 type).. 28.00-29.00
No. 12 alum. (No. 2 grade)... 24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.)... 25.75-26.00
AXS-679 (1 pct zinc) 25.00-26.00

(Effective Apr. 5, 1960)

Steel deoxidizing aluminum notch bar granulated or shot
- Grade 1—95-97½% 25.25-26.25
- Grade 2—92-95% 24.00-25.00
- Grade 3—90-92% 23.00-24.00
- Grade 4—85-90% 22.50-23.50

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 26½
- No. 2 copper wire 23¾
- Light copper 21½
- *Refinery brass 21¾
- Copper bearing material 21

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 26½
- No. 2 copper wire 23½
- Light copper 21¼
- No. 1 composition 20½
- No. 1 comp. turnings 20
- Hvy. yellow brass solids 15
- Brass pipe 14½
- Radiators 16

Aluminum

- Mixed old cast. ..... 14½—15½
- Mixed new clips ..... 16½—17½
- Mixed turnings, dry ..... 15 —16

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 23 —23½
- No. 2 copper wire ..... 20 —20½
- Light copper ..... 18 —18½
- Auto radiators (unsweated). 12½—13
- No. 1 composition ..... 16½—17
- No. 1 composition turnings.. 15½—16
- Cocks and faucets ..... 13 —13½
- Clean heavy yellow brass ... 11¾—12¼
- Brass pipe ..... 13½—14
- New soft brass clippings .... 14 —14½
- No. 1 brass rod turnings .... 11½—12

Aluminum

- Alum. pistons and struts .... 7½— 8
- Aluminum crankcase ..... 11¼—11¾
- 1100 (2s) aluminum clippings 15 —15½
- Old sheet and utensils ..... 11¼—11¾
- Borings and turnings ..... 7 — 7½
- Industrial castings ..... 11¼—11¾
- 2020 (24S) clippings ..... 12½—13

Zinc

- New zinc clippings ..... 7 — 7¼
- Old zinc ..... 4½— 5
- Zinc routings ..... 3¼— 3½
- Old die cast scrap ..... 2¾— 3

Nickel and Monel

- Pure nickel clippings 52-54
- Clean nickel turnings 40
- Nickel anodes 52-54
- Nickel rod ends 52-54
- New Monel clippings 28-29
- Clean Monel turnings 20-23
- Old sheet Monel 24-26
- Nickel silver clippings, mixed 18
- Nickel silver turnings, mixed 15

Lead

- Soft scrap lead ..... 8 — 8¼
- Battery plates (dry) ..... 3 — 3¼
- Batteries, acid free ..... 2 — 2¼

Miscellaneous

- Block tin ..... 75 —76
- No. 1 pewter ..... 55 —56
- Auto babbitt ..... 39 —40
- Mixed common babbitt ..... 9¾—10¼
- Solder joints ..... 13¼—13¾
- Siphon tops 41
- Small foundry type ..... 9¾—10¼
- Monotype ..... 9¾—10¼
- Lino. and stereotype ..... 8¾— 9
- Electrotype ..... 7½— 7¾
- Hand picked type shells .... 5¼— 5¾
- Lino. and stereo. dross ..... 2¼— 2¾
- Electro dross ..... 2¼— 2¾

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective April 4, 1960)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro** 0.25-lb. base box	Holloware Enameling 29 ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*		7.225 *E2*				6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*										
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

*Electrogalvanized sheets.

(Effective April 4, 1960)

*7.425 at Sharon-Niles is 7.225

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5, B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, B5*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10 N6*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective April 4, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Chicago, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (net) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50								
Youngstown *R3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50								
Fontana *K1*	+10.75	+26.00	+7.75	+22.00	+4.25	+17.50	+1.75	+16.75	+1.25	+15.75	+0.75	+15.25	0.75	+15.50								
Pittsburgh *J3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Alton, Ill. *L1*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50								
Sharon *M3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50								
Fairless *N2*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50								
Pittsburgh *N1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Wheeling *W5*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50								
Wheatland *W4*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50								
Youngstown *Y1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Indiana Harbor *Y1*	1.25	+14.0	4.25	+10.0	7.75	+5.50	10.25	+4.75	10.75	+3.75	11.25	+3.25	12.75	+3.50								
Lorain *N2*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50								
Youngstown *R3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50								
Fontana *K1*	+6.25		+2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Alton, Ill. *L1*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50								
Sharon *M3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Wheeling *W5*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Indiana Harbor *Y1*	5.75	+8.0	9.75	+4.0	12.75	0.50	13.25	+0.75	13.75	0.25	14.25	0.75	14.75	+0.50								
Lorain *N2*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

(Effective April 4, 1960)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2

High-carbon chromium.. .955 D-3, D-5
Oil hardened manganese .505 O-2
Special carbon ..... .38 W-1
Extra carbon ..... .38 W-1
Regular carbon ..... .325 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate (*L4, C4, A3, J2*) 15 pct	Plate (*L4, C4, A3, J2*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.90
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 44.20; 1 side, 36.80.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Ironton, O., f.o.b.	30.50
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	....	9.875	....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	....	12.475	....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective April 4, 1960)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4***	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dsv. *M4***	175	193	...	214	199	9.10	9.85
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.95	10.50
Rankin, Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50†
Sparrows Pt. *B3***	175	.....	.....	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Chicago	.....	.....	.....	15.60	.....
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots, except as noted)

Iron Powders

Sponge Iron domestic and foreign, 98 pct Fe, 100 mesh bags	11.50
Electrolytic Iron, melting stock, 99.87 pct Fe	28.75
Carbonyl Iron	88.00
Welding Grades	8.10
Cutting and Scarfing Grades	9.85

Copper Powders

Molding Grades	
Electrolytic, domestic, f.o.b. shipping point	14.25†
Atomized	47.50 to 65.50
Reduced	14.25†
Bronze, 5000-lb lots	54.00 to 57.60
Chromium, electrolytic	5.00
Lead	7.50†
Manganese, electrolytic	$1.00
Molybdenum	$3.60 to $3.95
Nickel	$1.15
Nickel-Silver, 5000 lb lots	60.90 to 69.70
Solder	7.00†
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.07
Tin	14.00†
Titanium, 99.25 + pct, per lb, f.o.b.	$11.25
Tungsten	$3.15 (nominal)

† Plus cost of metal.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)

Plain finish—packaged and bulk	50 pct
Hot galvanized and zinc plated —packaged	43.75 pct
Hot galvanized and zinc plated —bulk	50 pct

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)

Plain finish — packaged and bulk	50 pct
Hot galvanized and zinc plated—packaged	43.75 pct
Hot galvanized and zinc plated—bulk	50 pct

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish — packaged and bulk	50 pct
Hot galvanized and zinc plated—packaged	43.75 pct
Hot galvanized and zinc plated—bulk	50 pct

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Add 7½ pct for nuts assembled to bolts)

Machine Screws and Stove Bolts

(Packages—plain finish)

		Discount Screws	Bolts
Full Cartons		46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50	
5/16, ⅜ & ½ in. diam	15,000 pcs	50	

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 *lb*
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	48.00
Electrodeposited	40.00
Brass, 80-20, ball anodes, 2000 lb or more	53.00
Zinc, ball anodes, 2000 lb lots	19.75
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.30
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	27.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.70
(Philadelphia price 25.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24	.....	.....	.....	.....
Baltimore**	$.10	8.63	10.10	10.16	11.04	9.25	10.02	9.43	11.90	17.48	16.48	21.58	20.83
Birmingham**		9.43	10.20	10.46	10.41	9.29	9.50	9.09	13.14	16.76	.....	.....	.....
Boston**	.10	9.73	10.50	11.87	11.70	9.81	10.62	10.01	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.95	10.10	11.30	10.80	9.15	9.80	9.15	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.89	10.35	11.10	10.55	8.82	9.48	8.99	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	9.06	10.41	11.10	10.87	9.20	10.04	9.31	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.88[1]	10.03	11.29	10.66	9.07	9.90	9.11	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	9.15	10.61	11.45	10.92	9.19	10.04	9.30	11.16	17.38	16.38	21.48	20.73
Houston**		9.67	10.41	12.193	11.28	9.47	9.34	9.13	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.95[1]	11.55	12.20	11.55	10.00	10.00	9.75	14.20	18.30	17.35	22.90	22.20
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11	.....	.....	.....	.....
Milwaukee**	.15	9.03	10.49	11.24	10.69	8.96	9.70	9.13	11.04	17.24	16.24	21.24	20.49
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	16.16	16.50	20.10	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.20	10.10	10.99	11.20	9.65	9.95	9.60	12.05	16.58	16.48	20.08	20.03
Pittsburgh**	.15	8.88	10.03	11.18	10.64	8.83	9.51	9.00	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	11.00	11.95[2]	11.65	12.25	11.00	10.95	10.75	15.20	18.30	17.35	22.90	22.20
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.69	10.73	11.48	10.65	8.93	9.60	9.10	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	9.19	9.74	10.89	10.81	9.10	9.78	9.27	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective April 4, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	31.75 48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	43.75	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Detroit, *M2*; Louisville, O., *R5*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville Pa., *U2*; Detroit, *M2*; Detroit, *S1*; Canton, Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown, *R5*; Sharon, Pa., *S1*; Butler, Pa., *A7*, Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13*, (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1*, (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R5*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*, *R3*; Ft. Wayne, *I4*; Detroit, *R5*; Gary, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Ambridge, Pa., *B7*.

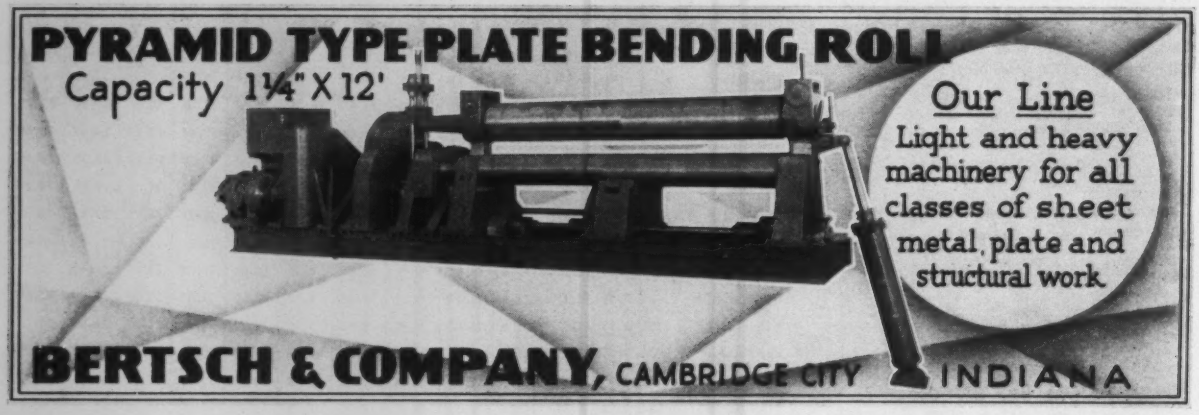
Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Newark, N. J. *D2*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*; Detroit, *R5*; Reading, Pa., *C2*; Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Ambridge, Pa., *B7*; Baltimore, *E1*; Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forging billets: Ambridge, Pa., *B7*; Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Reading, Pa., *C2*.

(Effective April 4, 1960)


PYRAMID TYPE PLATE BENDING ROLL
Capacity 1¼" X 12'
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Liqht and heavy machinery for all classes of sheet metal, plate and structural work
BERTSCH & COMPANY, CAMBRIDGE CITY
INDIANA

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Dissatisfied with present recruiting methods? The IRON AGE Employment Exchange is the meeting place for employers and men qualified in all phases of metalworking. For advertising rates, write to Chestnut and 56th Sts., Philadelphia 39.

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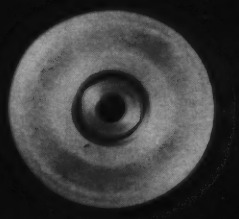
The First and Only SEE-THRU GRINDING DISC



Here is an in-action photo of the new VIZI-DISC. *See how the operator can "look through" the work area of the disc.*

VIZI•DISC

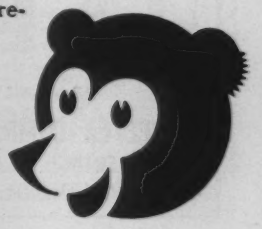
it's the METALITE

Outstanding new benefits for metalworking

These METALITE VIZI-DISCS let you "see through" . . . to the exact area where work is being done. Grinding action is intermittent, and the disc cools itself as it runs. The unique shape of the VIZI-DISC gives it "see-through" like a fan blade or an airplane propeller.

This minimizes the danger of burning work. VIZI-PADS (back-up) guarantee an aggressive rate-of-cut and longest disc life.

You can get a free demonstration . . . just call your Behr-Manning representative or write Dept. IA-4.



BEHR-MANNING CO.

TROY, NEW YORK – A DIVISION OF NORTON COMPANY NORTON

BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes • Floor Maintenance Products
NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals
In Canada: Behr-Manning (Canada) Ltd., Brantford. • For Export: Norton International Inc., Troy, New York, U. S. A.

ELECTRICAL POWER
EQUIPMENT IN STOCK

DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3900	New G.E.	Enc. S.V.	475	320
1	3000	New Whse.	Enc. F.V.	525	600
2	2700	G.E.	Enc. S.V.	415	280
1	2250	New G.E.	Enc. S.V.	600	200/300
1	2200	G.E.	Enc. S.V.	600	400/500
2	2000	G.E.	Enc. S.V.	350	230/350
2	1750	G.E.	Enc. S.V.	250	175/350
2	1500	Whse.		600	300/700
4	1500	New Whse.	Enc. F.V.	525	600
2	1400	G.E.	MCF	250	165/300
1	1300	G.E.	MCF-12	300	200/400
1	1200	G.E.	MCF	600	450/600
1	1000	Whse.		500	800/2000
4	1000	GM	D8	600	600/900
2	900	G.E.	MCF	250	180/360
1	850	G.E.	MCF	250	85/170
2	800	G.E.	MCF	250	400/750
3	800	G.E.	MCF	250	780
2	750	G.E.	MCF	600	450/900
1	750	G.E.	M.F.	600	120/360
2	645	S.S.	V.G.	300	1000
4	600	Whse.		250	275/550
1	500	G.E.	MPC-10	250	188/400
2	450	Whse.		550	415
4	400	G.M.	D8	250	300/900
2	400	G.E.	CY-275	300	1000/1500
1	300	Cr.Wh.	H-102 B.B.	230	1200
1	150	Cr.Wh.	CMC-65H	230	1150
1	150	G.E.B.B.	CD	600	250/750
1	150	G.E.B.B.	CDP-125	230	1750
1	125	Cont. B.B.		230	1750
1	100	Whse.	SK-180	230	450/1100
1	100	G.E.	CDP-115	230	1750
1	80	Whse.	SK-123.9	240	2000-4500
1	75	G.E.B.B.	CD-1235-D.P.	600	850

SWITCH GEAR

Large Stock Oil & Air C/BC can furnish in NEMA 1 Enc. or Open Magnetic or Manual Operation. What are your needs & I. C. Requirements.

MG SETS—3 Ph. 60 CY.

Qu.	K.W.	Make	RPM	DC Volts	AC Volts
1	4800	G.E.	450	300	2300/4600
1	2400	G.E.	450	300	2300/4600
1	2000	G.E.	514	600	2300/4600
2	1750/2100	G.E.	514	250/300	2300/4600
1	1750	G.E.	514	600	2300/4600
1	1500	G.B.	720	600	6600/13200
1	1500	Cr.Wh. 4 unit	720	100	2300
1	500	G.E.	900	125/250	440
1	500	G.E.	900	250	2300/4600
1	500 (New)	G.E.	1200	300	2300
1	350	G.E.	900	125	440/2300/4160
1	300	G.E.	1200	250	2300/4000
1	300	G.E.	1200	250	440/2300
1	250	G.E.	900	250	440/2300
1	240	Whse.	900	125	220/440
1	200	Whse.	1200	550	2200
1	200	El. Mhy.	1200	250	2300/4600
1	150	G.E.	1200	275	2300
1	150	Whse.	1200	275	2300
1	150	G.E.	1200	250	440
1	150	G.E.	1200	125	440
	140	Cr.Wh.	690	125/250	2300
1	100	G.E.	1170	250	220/440
2	100	Cr.Wh.	81160	525	220/550
1	100	G.E.	1200	250	2400/4100
2	75	Whse.	1200	125	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
3	3333	Whse.	OISC	1	13800 x 2300
1	3000	A.C.	OISC	3	34500 x 2300
3	1000	G.E.	OA/FA	1	13800 x 230/460
3	833	A.C.	OISC	1	4800/2400 x 480
3	833	A.C.	OISC	1	10175/13475x 2300/4000
2	750	G.E.	Pyranol	1	4800x85/55-255/165
3	500	Mal.	C	1	6600/11430Yx480
3	500	Kuhl	OISC	1	13200 x 6600
3	150	G.E.	OISC	1	33000x2300/4000Y
3	100	G.E.	HS	1	4800/8320Y x 120/240

CRANE & MILL MOTORS
230 V. D. C.

Qu.	H.P.	Make	RPM	Type
12	12/14	Whse.	700/600	MCA-30, Series
1	20	Whse.	975	K-5 Series
2	23	G.E.	650	MDS-408 Shunt
1	35	Whse.	480	CK-9 Comp. S.B.
1	35	Whse.	480	CK-9 Sh. R.B.
1	45	Whse.	600	CK-9 Comp. S.B.
3	50	G.E.	650	COM-1830 Comp.
2	50	Whse.	525	CK-9 Shunt R.B.
2	50	Whse.	600	CK-9 Comp. R.B.
1	50	G.E.	525	COM-1830AEB.B.
1	50	Cr.Wh.	550	SW-50 Comp.
9	125/165	G.E.	625/575	CO-1832 Ser.
1	100	G.E.	475	CO-1832 S.B.
6	100-140	Whse.	500/415	MC-90 R.B.

Above only partial listing of our available stock.

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Philadelphia Sales On the Upturn

Used machinery dealers in the Philadelphia area say business is getting better again.

Although March sales did not equal those of the first two months, they see a good year ahead.

■ Used machinery business in the Philadelphia area is fair to good, dealers say. It's an exception to generally bearish business trends.

Most dealers say March business has dropped off somewhat from January and February levels. But there are still a good number of sales.

Inquiries High — Inquiries are high in all lines. And closures are good. There has been no buying trend in any particular machines, dealers say. Everything is moving. One dealer says he made two closures in two days.

Another says his export business is on the steady upturn. Most of it is power equipment to Mexico. He says he has been doing very well in this line, and the only delays encountered are those when Mexican buyers have to come to Philadelphia to inspect the equipment.

Dealers expect that the coming months will see a business upswing.

Better Days — These conditions completely reverse the business state that Philadelphia dealers suffered through during the steel strike. In the last few months of 1959, business had come to an almost complete standstill.

Across the river in Camden, N. J., however, business is not up to seasonal levels. One dealer there reports business is "certainly not booming." Inquiries are low. He blames part of the situation on tight money.

In Allentown, Pa., business is "better than ever." One dealer says he increased his sales staff 100 pct and that it has paid off. His men are making more calls and the result is more sales.

Know-How — His salesmen all have technical background, and this, he says, is helping sales. Now he offers engineering aid while making a deal.

He says a good cross section of equipment is moving at a fast pace. Modern machinery is moving as fast as he can get his hands on it. Only boring mills and big lathes are at a standstill.

He says business has doubled since this time last year. And indications are that it will continue to go up.

MDNA Convention Set

The 1960 convention of the Machinery Dealers National Assn. will be held May 11 through 14 at the Edgewater Beach Hotel, Chicago.

The event will begin with a board of directors meeting the first day. There will be business sessions on the following two days.

The Man of the Year Award will be presented May 13 during the annual banquet. At the same time new officers will be installed.

FOR SALE

3—Elliott steam turbo-blowers 33333 cfm at 10 psig.

1—18¾" x 24" Buckeye Steam Engine 338 H.P.

1—Connersville Blower 36" x 54". Size No. 11. 96 cu. ft. per rev.

1—225 H.P. Westinghouse Synchronous Motor with two (2) 75 K.W. D.C. generators. Transformer incl.

3—25 H.P. Allis Chalmers D.C. Motors.

1—Cummins Diesel Engine — Model S.P.S.D. H-6.

2—Bullock D.C. Generators 20 H.P.

3—Sturtevant Fans Design 4 Size 85.

1—25 H.P. Allis Chalmers Motor and 4" Centrifugal Pump.

1—Bowser Lubricating Oil Storage System (700 gal.).

32—Fulton Sylphon Steam Temp. Regulators. Style 921 Z/F.

1,000 ft. Spec. Corrugated Metallic Steam Hose ½" I.D.

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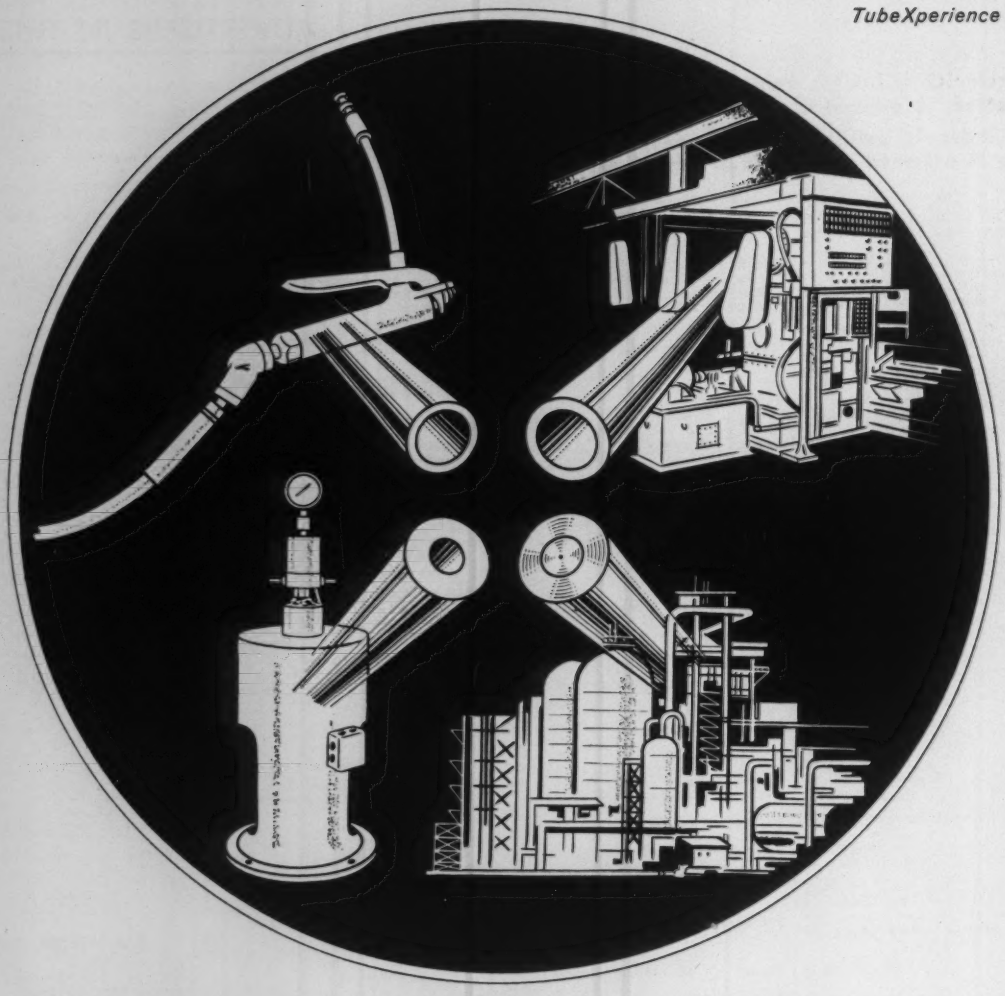

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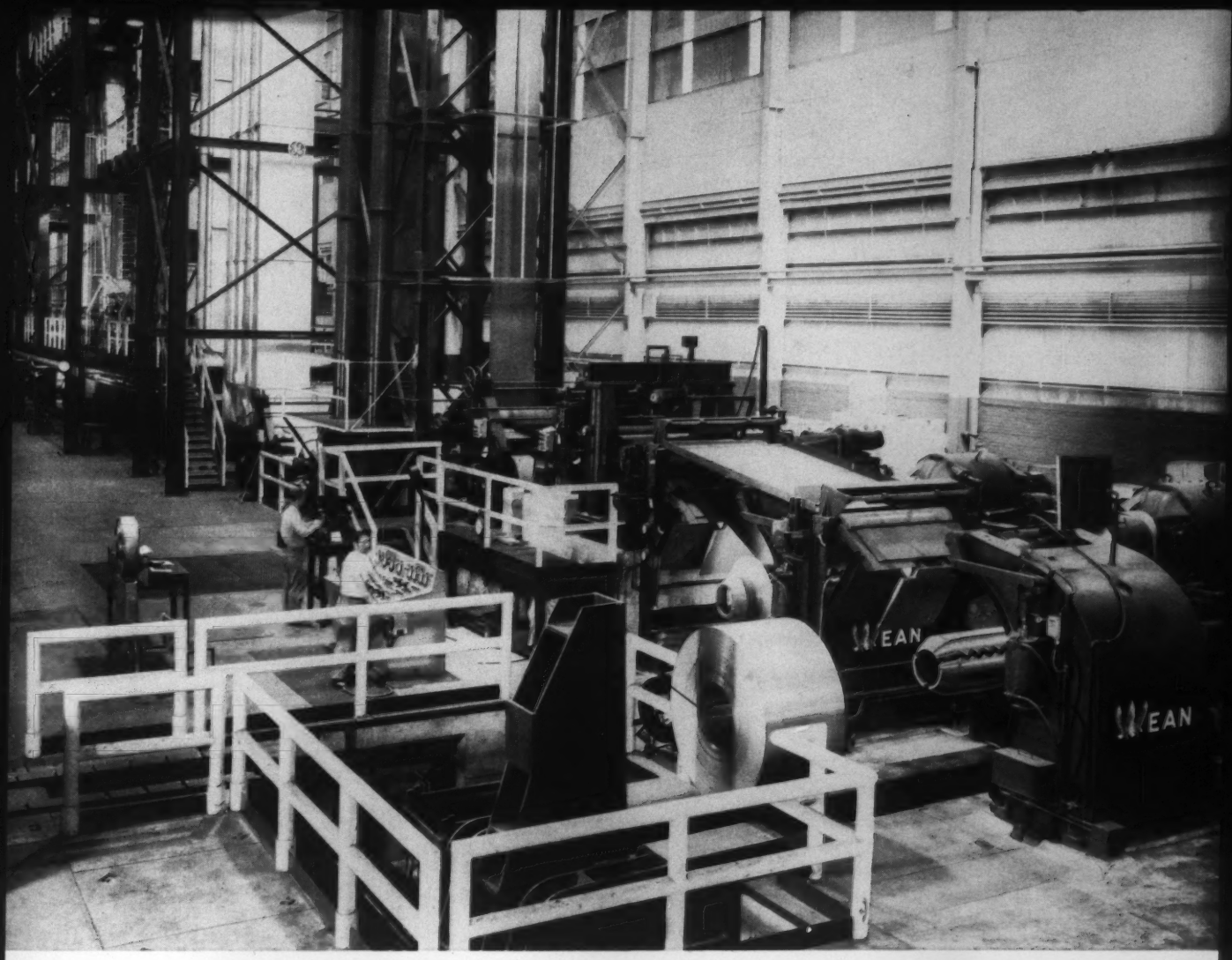

Wean incorporates new design features in Wheeling Steel's tin plate annealing line

The most recent addition to Wheeling Steel Corporation's tin plate processing facilities at its Yorkville plant was this Wean continuous annealing line. Designed to produce a wide range of closely controlled temper tin plate, the continuous annealing line was put into full-scale operation in May, 1959.

Among this line's new features are (1) improved design looping towers for entry and exit strip storage; (2) extra-high freeboards to check splashing of solutions in the cleaning tanks; (3) controlled atmosphere jet cooling system to bring strip to handling temperature; (4) a single, traveling down-ender to handle two recoilers. All tin plate gauges can be annealed on this new high speed Wean line.

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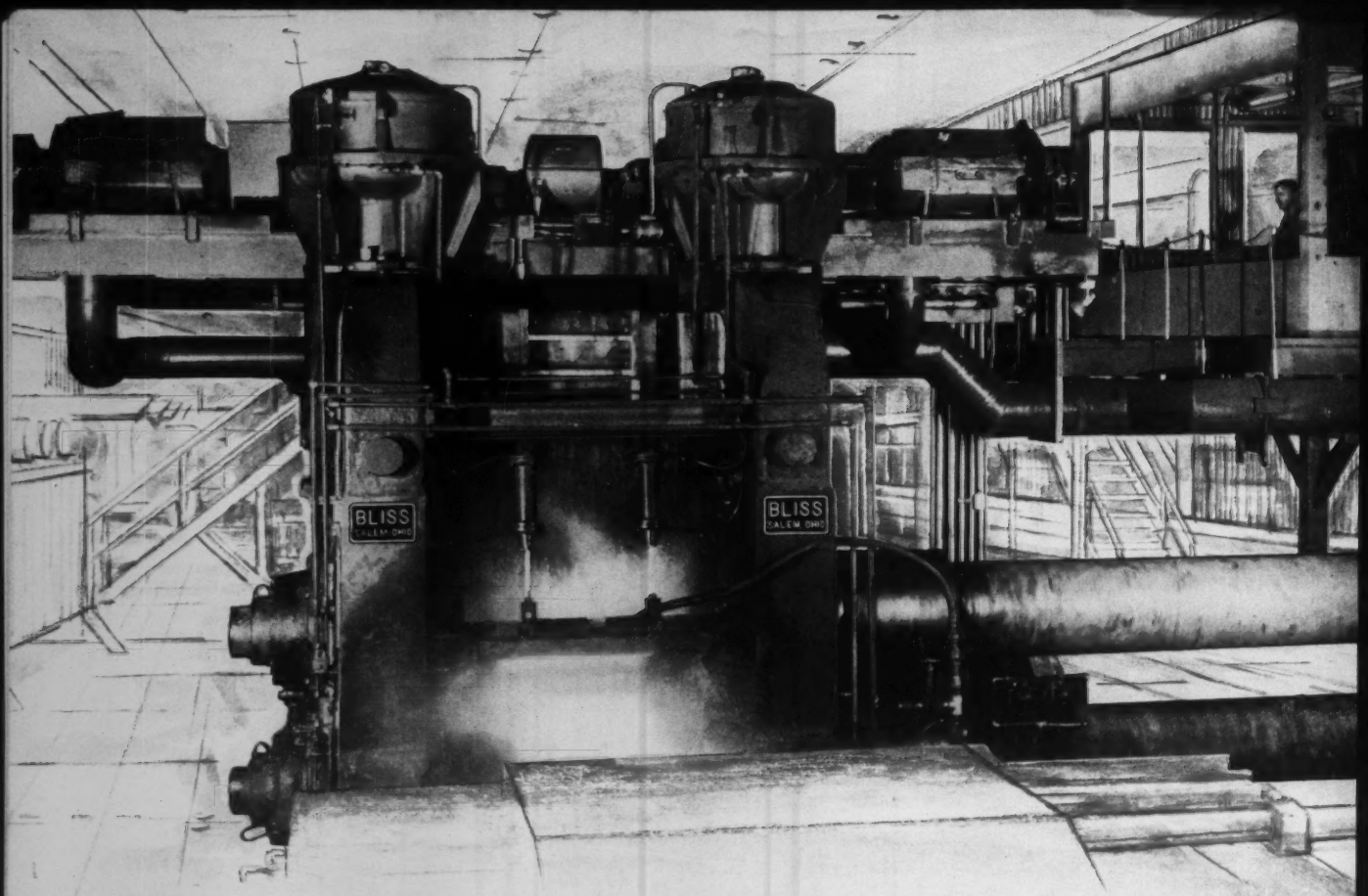

Empire-Reeves changes one mill stand, gains 85% boost in hot strip capacity

The famous hot strip line at the Mansfield, Ohio plant of Empire-Reeves Steel Corporation... the first mill in the world to roll fine-gage strip from ingot in a straight line without a reheat... has just had its capacity practically doubled by replacing a three-high one-way intermediate roughing mill with the new Bliss 38" x 52" reversing mill shown here.

Before the addition, the line averaged fifteen 4-to-5-ton ingots per hour. With the new Bliss mill, capacity ranges to 28 to 30 ingots per hour. Five-inch slab coming from the slabbing mill at the head of the line is reduced to ½-inch, where formerly the slabber had to roll the ingot into ¾-inch slab before the single pass through the old intermediate rougher.

Efficiency of the new mill is further enhanced by the use of a control system that automatically resets the mill between passes at the touch of a button.

Besides the new mill, Bliss' Rolling Mill Division built and installed a new shear that crops the strip ends before the strip enters the finishing train, and provided the new expanding-mandrel type downcoiler at the end of the line.

Whether you're interested in a single mill or a complete rolling plant, you'll find that the Bliss Rolling Mill Division will bring a sharp insight to your special rolling problem . . . an insight that can translate mill design and layout into striking new economy and efficiency. For examples of its work, write today for a free copy of the new 84-page Bliss Rolling Mill Brochure, Catalog 40-B.

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